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UNIVERSITY OF TORONTO

REPORT OF THE DEAN

OF THE

FACULTY OF MEDICINE

Session 1957-1958

PRINTED AT THE UNIVERSITY OF TORONTO PRESS
TORONTO, CANADA, 1959

Report of the Dean of the Faculty of Medicine

One hundred and nineteen students were graduated in Medicine at the special convocation for Law and Medicine on June 13. This number is somewhat smaller than usual—not because of any plan to reduce enrolment, but rather because the admissions committee of the Faculty, when they were selecting entrants to the first professional year, overestimated the number in this class who would complete the premedical examinations. We try to arrange the classes so that there will be approximately one hundred and fifty students in each of the professional years. Twenty doctors qualified at the same time for the Diploma in Psychiatry, fourteen for the Diploma in Public Health, six for the Diploma in Medical Radiology, and six for the Degree of Bachelor of Science in Medicine. At an earlier graduation ceremony, fifty-nine girls received the Diploma in Physical and Occupational Therapy, and two students received the Diploma in Art as Applied to Medicine.

Students qualified for honours and scholarships in the undergraduate course in about the same numbers as in other years. It is noteworthy that one of the two Rhodes Scholars selected to represent Ontario at Oxford University was a member of the graduating class in Medicine. The award of one gold and two silver Cody Medals was reinstated this year.

Although the Faculty of Medicine is not as immediately concerned with expansion plans as are some of the other faculties and schools, there are some immediate needs which it is hoped it will be possible to meet early in the expansion programme. The research areas in the Banting Institute are seriously crowded, and it is hoped that the east wing of the building may be completed in the upper levels as was planned when the building was put up in 1926. There is also serious need for air conditioning and modernization of the animal quarters on the sixth floor, as well as for the provision of boarding kennels on the outskirts of the city for animals under long term observation.

The increased load of teaching of physiology to students in faculties other than Medicine has already resulted in the maximum utilization of all the teaching and student laboratory space in the Best Institute, and the research quarters here are becoming crowded. It is hoped that the extra three storeys originally planned to be erected over the lecture room may be completed without too much delay.

The buildings which presently house the Division of Physical and Occupational Therapy will be demolished to make way for more modern structures in the new plan, and it is expected that the Division will move to the old stone building on Queen's Park, now occupied by the Department of Zoology.

New plans made early last year resulted in a reduction of lectures in the third medical year, and an increased amount of time for practical work. The lectures in the History of Medicine have been removed from the curriculum of the second medical year and introduced in the second premedical year. Dr. W. R. Feasby is in charge of the newly arranged schedule, but he continues to call on Dr. William Boyd and Dr. R. I. Harris to deal with special subjects of the course. Throughout the year there have been continuing discussions about the present system of teaching. Dr. Wightman is chairman of a small committee which will bring in recommendations as to ways and means for a more searching and prolonged investigation of teaching methods and curriculum content, in the light of present-day knowledge and future needs in Canada. It will probably be necessary to seek financial support from some of the foundations which are interested in medical education, and it is hoped that we may find a young man who is keenly interested in teaching and teaching methods, and who might devote one to two years in the capacity of executive secretary to the task of helping the committee in their work.

By a further agreement between the Women's College Hospital and the University, a closed teaching unit of forty beds in the division of Medicine has been

established in the hospital, and students will attend for undergraduate teaching for the first time in the autumn of 1958, under the direction of Dr. Jean Davey, the physician-in-chief, who has been appointed to the Department of Medicine in the University as Assistant Professor. She will be assisted in the teaching programme by Dr. Joan Vale and Dr. Marguerite Hill. Teaching in the division of Obstetrics and Gynaecology has been carried on successfully for the past two sessions.

Dr. Botterell's committee brought in a report early in 1958 which dealt with the possible effects of universal hospital insurance on the teaching of clinical medicine. The report was adopted by the Council, and, after copies had been sent to the other medical schools in the province, was forwarded to Mr. Swanson, the chairman of the Ontario Hospital Services Commission. The chairman, in acknowledging the receipt of the report, expressed appreciation for the interest of the medical schools and assured us that everything possible would be done to safeguard the facilities for the teaching of clinical medicine. The Association of Canadian Medical Colleges had, in the autumn of 1957, presented a brief to the Minister of National Health and Welfare, which dealt with the same matter, and urged that nothing in the enabling legislation should in any way result in the limitation of teaching of undergraduate medicine and the training of specialists.

The Association of Canadian Medical Colleges also presented a brief at the same time to the Minister of Trade and Commerce, the Minister of Veterans Affairs, and the Minister of National Health and Welfare, urging an increased budget for medical research through the National Research Council. We had a very satisfactory hearing, and it was gratifying to note that the medical committee of the National Research Council was informed in February that the allocation of funds for medical research would be increased by $500,000.

A Department of Medical Biophysics was established in the Faculty, effective July 1, 1958. The new department will be centred in the research areas in the Ontario Cancer Institute* on Sherbourne Street. Dr. Arthur Ham, for many years a member of the Department of Anatomy, will be the head of the Department, and he will be closely associated with Dr. Harold Johns, a member of the Department of Physics in this University for the past year, previously in charge of radiation physics in the University of Saskatchewan. The new institute is particularly well equipped with facilities for investigation in this area of ever increasing importance—the interrelation of physical forces and living matter. The new department has been recognized as a graduate department in the School of Graduate Studies, and it is expected that students proceeding to the degrees of M.A. and Ph.D. may be enrolled in the autumn of 1958. The areas of particular interest and investigation include cellular biology, electron microscopy, immuno-chemistry, virology, radiobiology, radiotherapy, and radiation physics.

The work of the Division of Postgraduate Education continues to expand and plays a most important role in the activities of the school.

A new course in electro-encephalography has been authorized. It will begin this autumn, and the students in the first six months will be engaged in lectures, laboratories, and seminars dealing with the basic sciences and practical demonstrations. This will be followed by six months' attachment to an active hospital department of electro-encephalography.

The Faculty is offering this autumn for the first time a two year diploma course in Speech Pathology and Audiology. There seems to be a need for men and women with training in this field. Those at present engaged as therapists have had their training in the United States or Great Britain. The University of Montreal has recently established a course to meet the needs of French Canada. The Government of Canada has granted limited financial support for the course in its early stages.

The name of the Diploma in Industrial Hygiene has been changed to Industrial Health. A widely representative committee under the chairmanship of Professor

*Since the writing of this report, the Ontario Cancer Institute, including as it does facilities for both treatment of and research in cancer, has been renamed, by gracious consent of Her Royal Highness, the Princess Margaret Hospital.

Rhodes, the Director of the School of Hygiene, has reviewed the curriculum and the arrangements for presenting material in this field. The committee recommended wide revisions in line with present-day Canadian needs. The committee also recommended that the course be offered on a part-time basis over two academic sessions for those who find it impossible to devote full time during one session. These recommendations were approved and will be effective with the session 1958–9.

The varied and extensive interests in research are reflected in the departmental reports. Of more than usual significance is a project supported by a Federal Health grant which is investigating the increase in background radiation and its possible biological effects. This is a joint project under the direction of a presidential committee on which sit representatives of the Department of Physics, the School of Hygiene and the Faculty of Medicine. Apparatus has been assembled and facilities established in the Physics Building which permit the accurate determination and estimation of certain radioactive materials in the human body, as well as in samples of soil, water, and vegetation. This is a long-term investigation in an area which is of increasing significance to all citizens of our country.

Buildings

The research departments of the new institute on Sherbourne Street have been operating throughout the year, and the out-patient clinics and the in-patient area gradually took over the work of the old institute on University Avenue during the early spring of this year. This experiment in co-operation between the teaching hospitals—this modern institute with facilities for basic research and the latest devices for treating patients with ionizing radiation—has already attracted the interest of clinicians and investigators from many other centres. The plans for its formation, financing, administration, and staffing have engaged the attention of many people in the provincial government, in the University, in the teaching hospitals, and in the Ontario Cancer Research and Treatment Foundation over several years. It gives promise of being a great centre for investigation and treatment of cancer and for the training of scientists, and an important addition to this teaching community.

At the time of writing, the only units available for use in the new addition to the General Hospital are the lecture rooms and the students' common room. The new lecture room will probably be taken into general use in the coming session. It is hoped that the old lecture room may still be available for lectures also. With increasing numbers of postgraduate courses and special lectures, there is need for two such large rooms. The new common room has been in use for several months, and the students are fortunate in the arrangements whereby coffee and other refreshments are served graciously and at extraordinarily reasonable prices by women volunteer members of the hospital committee.

The Western Hospital is proceeding with additions and alterations which will greatly improve and increase its facilities as a centre of treatment, teaching, and investigation.

I have tried in successive annual reports to stress the need for a new psychiatric institute. This need has been investigated by the Board of Governors of the University and presented to the Government in a comprehensive report. It is obvious to anyone who is familiar with the present situation. The rather antiquated eighty-bed receiving hospital was built in 1926 to serve the needs of a city one-third its present size, to provide for undergraduate teaching (the lecture theatre will now not accommodate a full class in Medicine), to be a centre for training psychiatrists for the province, and a nursery of research and investigation. Dean Clarke's vision of those days was realized. The hospital was a joint venture of the Government of Ontario, the city of Toronto, and the University. It has done excellent work, but a new building is badly needed—a building which will give increased facilities for treatment (both out-patient and day care as well as in-patient); facilities for basic research; and facilities for teaching and training not only in psychological medicine, but in all the ancillary branches which are so important to modern psychiatry.

In a field where costs of medical care are greater than for any other illness, a field which in the past has lagged far behind other branches of Medicine in research and enquiry, but in which there are successively brighter lights burning in a previously darkened horizon, a field in which there is at all levels of society increasing need to understand the very beginnings of break-down, and indeed all the illnesses that are included in the broad area of psychiatry, it is disappointing to report that our central physical facilities, both for treatment and for teaching and research, are primitive and outmoded. The delay in plans to correct this situation is difficult to understand. The maintenance of a staff with the training, imagination, and foresight necessary to deal with the urgent problems of psychiatry may present serious problems in the face of recurrent disappointments and temporizations.

Staff

Dr. H. Cullumbine has resigned from the chair of Pharmacology. During his regrettably short stay here he has established a firm reputation as a first class teacher, a sound investigator, and has attracted to his laboratories increasing numbers of young graduate students in Pharmacology. For personal reasons he has decided to accept a post in Philadelphia. Dr. Edward Sellers has been appointed to the chair; he is a graduate of the University of Manitoba, who after service in the navy joined the university staff here in the Department of Pharmacology. He subsequently transferred to the Department of Medical Research, and for the past two years has been Director of the Defence Medical Research Laboratories, the principal medical research organization of the Defence Research Board. Dr. Sellers brings to the department the advantages of his previous experience in teaching and research here, his own valuable contributions in the research field, as well as considerable experience in administration and familiarity with the physiological and pharmacological problems that are peculiar to Canada.

Dr. F. I. Lewis retires from active association with undergraduate teaching on the wards of the General Hospital, where he has been the surgeon in charge of the Ward A service for the past ten years. Dr. Lewis has been a very valuable teacher and director of surgery. As one sees from year to year a succession of clinicians retire from active teaching while still mentally and physically vigorous, there arises the question of whether the problem of retirement age should not again be reviewed. There are, of course, arguments in favour of early retirement, but it is notable that in business and other professions there is an increasing tendency to retain the services of older men, provided they are physically and emotionally fit. Dr. Lewis, of course, will continue in his private practice, and will, we know, maintain an active interest in the welfare of the Department in which he has given such valuable service.

Dr. Desmond Burke has resigned from the Department of Radiology on giving up his post as radiologist of Sunnybrook Hospital. Dr. W. G. B. Casselman has resigned from the Department of Anatomy to take a research post in New York. Dr. D. L. J. Bilbey of King's College, London, England, is expected to join the Department of Anatomy in September.

Dr. Howard McCart of the Department of Oto-Laryngology died after a rather long illness. He had been a member of the Department since 1926, interrupting his hospital and teaching work to serve in the Second World War as the specialist in oto-laryngology with #15 General Hospital. Dr. Lionel Armstrong, who had just retired as the senior obstetrician and gynaecologist to the Western Hospital, died in February after a brief illness. Both these men will be remembered gratefully by their colleagues, and by generations of students and internes, as outstanding practitioners of their respective specialties, and as sound teachers and preceptors of students and resident staff.

It is with a deep sense of sorrow and loss that one records the death of Mrs. Margaret Proctor who for several years worked in the medical office and during that time had special interest in the work of the Post-Graduate Division. She was always gracious, pleasant and untiring in her efforts to improve the service of the office for

the benefit of both undergraduate and postgraduate students. Her fortitude and cheerfulness in the face of a disease of which she had complete knowledge and understanding were truly remarkable.

Mr. Charles Hart who for many years was the supervisor of the lecture room in the Toronto General Hospital was familiar to generations of medical students and he was frequently caricatured, but always with kindness and affection, by succeeding writers of Daffydil. He reached the age of retirement last session and has gone to spend his well-earned years of leisure with his daughter in England. We wish him health and happiness in his return to his native England. Mr. M. Kelly, a native of Glasgow, and recently arrived from Britain, has taken over Mr. Hart's duties.

Visitors and Special Lectures

The Balfour Lecture was given in the autumn by Professor John Bruce, the newly appointed Regius Professor of Clinical Surgery in the University of Edinburgh. The Phi Delta Epsilon Lecture was given by Dr. Rachmiel Levine of Chicago. The school was privileged to have a visit from Professor Sir Walter Mercer, the retiring President of the Royal College of Surgeons of Edinburgh. He lectured to the students and resident staffs and visited the teaching hospitals. The exchange visitor from the Middlesex Hospital was Dr. Evan Bedford. He spent a month in the autumn term visiting the various teaching hospitals and taking part in teaching. His main interest is cardiology.

Dr. R. M. Janes, who retired as Professor of Surgery in July, 1957, spent four months as Sims Travelling Professor of the Royal College of Surgeons of England, visiting the countries of the Commonwealth in the continent of Africa.

Professor J. D. Hamilton, the head of the Department of Pathology, spent three weeks in France at the invitation of the Government of France, lecturing in the French language at the Sorbonne and other medical schools.

Dr. Nelles Silverthorne spent two weeks in Ecuador lecturing and teaching in paediatrics.

Honours

Professor S. M. Campbell was elected Vice-President of the Academy of Anaesthesiology, and was presented with the Honorary Scroll of the International Anaesthesia Research Society at New Orleans. Professor R. A. Gordon was elected a member of Council of the World Federation of Societies of Anaesthesiologists. Professor S. H. Bensley was elected to the Executive Council of the American Association of Anatomists. Professor A. M. Wynne was elected the first President of the new Canadian Biochemical Society. Professor J. C. Laidlaw received the Award of the Society of Obstetricians and Gynaecologists of Canada for 1958. Professor G. A. Henry has been elected President of the Canadian Otolaryngological Society. He was also the official English-speaking delegate to the International Congress of Otolaryngology. Dr. J. A. Sullivan was appointed a member of the Senate of Canada, and was named Honorary Surgeon to Her Majesty the Queen. Dr. Richard D. Rowe was awarded the 1957 Medal in Medicine of the Royal College of Physicians and Surgeons of Canada. Professor C. E. Snelling was re-elected State Chairman of the American Academy of Paediatrics, District V, and appointed Chairman of the State Chairman Groups of that organization.

Professor J. A. Dauphinee was elected President of the Medical Council of Canada. Professor A. C. Singleton was elected President of the American College of Radiology. Miss Ruth O. F. Bradshaw was elected President of the Canadian Physiotherapy Association.

Dr. W. G. Bigelow was elected Vice-President of the International Cardiovascular Society (North American Chapter). Professor E. H. Botterell was elected Vice-President of the World Federation of Neurosurgical Societies. Dr. H. S. Coulthard was awarded the Canadian Tuberculosis Association Overseas Scholarship for 1958.

Professor N. C. Delarue was named National Chairman, Water Safety Service Committee, Canadian Red Cross Society. Professor S. D. Gordon was appointed a Member of the Council of the British Association of Plastic Surgeons. Professor F. G. Kergin was elected Vice-President of the American Surgical Association. Professor R. C. Laird was elected President of the Academy of Medicine of Toronto. Dr. W. K. Lindsay was elected Chairman of the Medical Advisory Board of the Ontario Society for Crippled Children and Chairman of the Medical Board of the Treatment Centre. Dr. P. F. McGoey was made a Knight of the Holy Sepulchre of Jerusalem. Professor C. H. Best received an Honorary Doctorate from the Central University of Venezuela and was made an Honorary Life Member of the Venezuelan Endocrine Society and the Venezuelan Society for Advancement of Science. Dr. George Wilgram was awarded the Ciba Foundation Prize for basic research relevant to the problems of ageing.

Financial Report

The Medical Alumni increased their contributions this year to a total of $12,000 in scholarships and bursaries and loan funds. Dr. Wallace Duncan of Cleveland increased the amount of the Mary and Wallace Duncan Fund by a further $5,000.

Postgraduate and special training has again been strongly supported through grants from the McLaughlin Foundation. Several scholars from our school are enjoying these fellowships. There are two fellows under the Markle Foundation, both doing excellent work in teaching and investigation. Two men have received support for postgraduate training under the McLean Foundation. The research work of the school has been strongly supported in several areas by the Bickell Foundation.

The school continues to receive support from the government granting bodies, the National Cancer Institute, the Ontario Cancer Research and Treatment Foundation, the Canadian Arthritis and Rheumatism Society, and several private bequests and gifts. The Atkinson Charitable Foundation grant, which has for the past five years made it possible to establish and operate a special unit in the Banting Institute for the direction of the clinical use of isotopes, has been terminated. The Faculty of Medicine is extremely grateful for the very liberal support of the Foundation, which has enabled the school to give a lead in this new field. The hospitals and the University can now make arrangements for the continuance of the work.

It is again a pleasure to acknowledge my appreciation of the skilled, cheerful, and efficient service of the secretarial staff in the administrative offices of the school.

J. A. MacFarlane

Division of Postgraduate Medical Education

Under the direction of Professor R. Ian Macdonald

During the year under review the Postgraduate Committee continued to explore ways and means of mobilizing the resources available within the Faculty for postgraduate teaching. The educational needs of graduates vary a great deal; and the arrangements necessary to provide experience and training for recent graduates are quite different from those designed to help men who have had extensive experience in practice and wish to return to the University for a short refresher course or for instruction in some of the newer developments in medicine.

Approximately 528 graduate students were registered with the Division during the year. Of these, 80 were registered in courses leading to diplomas in medical

radiology, psychiatry, public health and industrial hygiene; 144 were registered as internes or residents; and 76 in regular sessional courses in anatomy, oto-laryngology, anaesthesia, ophthalmology, dermatology, and in the B.Sc. Medicine course. All of these aforementioned groups were working as full-time graduate students in either clinical or basic science departments, in intimate contact with university staff and in an academic as well as a clinical atmosphere. Whenever it seemed necessary to share the experience of one group with that of another, arrangements were made for special lectures or demonstrations. A regular series of lectures was scheduled for graduate students in medicine, surgery, and obstetrics and gynaecology, and the Departments of Pathology and Anatomy also provided additional instruction at hours least likely to conflict with hospital and departmental responsibilities.

The larger group of postgraduate students was composed of practising doctors. Many of these had a limited time for postgraduate courses and generally they wished to have special instruction in a limited field or broad "refresher" courses of short duration designed to bring them up to date on recent advances in medicine and surgery. The session opened with the Advanced Graduate Courses in Medicine, Surgery and Obstetrics and Gynaecology for which sixty students were registered. This six weeks' course has been given annually and is organized to provide for the needs of people well advanced in their training or who are returning for an advanced course in a specialty. Other short courses were given in eye surgery, public health, radioactive isotopes, neuro-anatomy, and anatomy for obstetricians and gynaecologists. The Refresher Course in Public Health was given in the School of Hygiene by the staff of the School with the co-operation of this Division. It was most successful and it is anticipated that each year the School will give a short refresher course on some subject of particular interest to medical officers of health and others engaged in special fields in public health. The first annual course in fractures and trauma was given in the winter term and it proved to be highly successful. This course, generously supported by the E. P. Taylor Fund, was designed to bring the latest ideas about the diagnosis and treatment of fractures and trauma to the attention of the profession; and the level of instruction was calculated to meet the needs of men who already have had a good deal of experience in the treatment of fractures and trauma.

The Faculty continued to take part in decentralized clinics which were supported by different medical societies in Ontario and by the Department of Health of Ontario. Eleven centres were visited by fifty-four members of the university staff who gave a total of twenty-eight clinics. Usually the university team was made up of a physician and a surgeon who would conduct the teaching clinic in a place arranged for by the local medical society. At all of these clinics cases were prepared and presented by the local doctors and discussed subsequently by the visiting clinicians and colleagues in the local group. As in previous years clinics continued to be informal so that everybody in the audience could, if he wished, take part in the discussion. A special group of clinics was held with the support of the Ontario Heart Foundation. In these clinics cases were restricted to instances of cardiovascular disease. Seven centres were visited by thirteen university teachers and in almost every instance, following the scheduled programme, local doctors had the opportunity of bringing up problem cases for consultation with the visitors and for discussion with their colleagues.

During the year arrangements were completed for a special course in electro-encephalography which will commence in the fall term. This is mentioned in more detail in the Dean's report.

Discussions were continued with the Ontario Medical Association regarding postgraduate medical education. The Education Committee of the Ontario Medical Association has accepted the principle that the needs and wishes of the different medical societies throughout Ontario should be made known sufficiently far in advance to allow for careful planning and co-ordination of effort. It is predicted that this co-operative planning will enable the different medical schools in Ontario to use their facilities for postgraduate education to better advantage than at present. The consequent benefits to medicine and to the public generally are bound to be great.

Medical Society

(September, 1957, to June, 1958)

Honorary President	Dean J. A. MacFarlane
Honorary Secretary-Treasurer	Dr. E. B. Tovee
Chairman	Dr. Bernard Langer
President	R. C. Bull
Vice-President	J. S. Rodgerson
Treasurer	J. P. Davidson
Secretary	Miss A. E. Cuddy

This year's Medical Society activities reflected true student enthusiasm. I hope they quelled that apathy cliché forever. The Assembly was blessed by an amiable group that came to the bi-weekly meetings for enjoyment rather than out of a sense of duty. Each committee's activities were handled so well that the President's job was reduced immeasurably, and the efficiency and reliability shown by each member are deeply appreciated. We can point to our many accomplishments with pride; our failures can be rationalized with sincerity, and we can truthfully say that it has been a rewarding and enjoyable year.

The conscientious work of our Treasurer, Pete Davidson, and the quiet manner in which our Chairman, Bernie Langer, "pulled the Assembly up by the boot straps" when required are due a special vote of thanks.

Our sincere appreciation is given to Ann Cuddy, Secretary, not only for her efficient work during this past session but for the excellent job she did of typing and mimeographing the Constitution.

In the Medical Athletic Association, Bob MacDonald did a most conscientious job with a tremendous personal effort. He carefully maintained his budget and added new equipment and awards and made plans for an equipment locker and storeroom. Two inter-faculty championships were won, three other teams were finalists, and our participation per capita is still first in lacrosse and waterpolo.

The Medical Women's Undergraduate Association had a very successful year both socially and athletically. Their activities are described in more detail in the report of the President, Vera Heller.

The At-Home showed a further attendance drop but proved to be one of the best in six years. Jim Rodgerson and his committee should be pleased with their effort, especially Dick Charron who masterminded the unique decorations. The crowning of a Queen instead of the usual entertainment was well received.

It was most enjoyable for the Executive to spend a day at the Dean's farm last autumn, and we thank Dr. and Mrs. MacFarlane for their hospitality.

The Public Relations Committee was reorganized under the direction of Al Hotti. The Freshmen were received with a full programme which included a welcoming letter from the committee, campus library tour, banquet, monster "stag" dance, orientation lecture, and hospital tour.

The Probe, resurrected last year, proved in three issues to be a vital asset to the Society. We are very proud of the improvement in this Faculty paper and know that it will be invaluable in publicizing the Society's activities as well as student opinions.

This Committee also sponsored a Jack Martin Day to honor our friend from the Common Room in the Toronto General Hospital when he moved to his new job at University College. His twenty years were rewarded by a party, a gold watch, and a scroll with two hundred names.

We are exuberant over the success of this year's Daffydil. The clean, high-calibre book show, orchestra, Epistaxis, and the comical programme were splendid. It was undoubtedly the best in our history, and moreover it succeeded financially.

We are certainly blessed by considerable musical talent. This year a permanent medical student orchestra was organized and distinguished itself at Daffydil, the Annual Concert, and the elections.

The vigorous programme of the Arts and Letters Club was well received this year, and John Mogan is to be commended for his attempt to mould a cohesive unit from several varied organizations. Introductory lectures in public speaking and debating elevated the calibre of our debates. The Osler Society presented a fine programme featuring distinguished Faculty members as speakers.

In the Canadian Association of Medical Students and Internes Gord Perkin and Bas Orchard continued George Langmyhr's good work with the insurance plan, movies, CAMSI journal, C.M.A. journal subscriptions, general practice forum, and summer employment. They were instrumental in changing government legislation re dependents and saved from $60 to $80 for each student. They also attended the Ontario Medical Association meetings as liaison officers and helped influence the Ontario College of Physicians and Surgeons against deciding to restrict interneships. It was recommended that the new CAMSI group make a comprehensive survey of the interneship problem and specifically suggested that they continue their vigorous activity re salaries, starting early in the fall.

The CAMSI undertaking of preceptorships which allows interested final year students to live with a general practitioner for two weeks in the fall has been well received and fills a gap in our university training. These men deserve every compliment for elevating CAMSI from a position of scorn to one of such respect that the senior L.C.O. almost automatically becomes President of the graduating year.

Elliot Barker, Warden of the common rooms, provided a new counter in the Duncan Room and submitted a well-planned proposal for renovating it completely to provide both lounge and lunchroom facilities; a free telephone for the Medical Building was also provided. He also acted as liaison officer to the Toronto General Hospital Ladies' Auxiliary working with them in establishing the new students' common room at the General.

Gord Forstner should be congratulated for his reoganization of the Staff-Student Committee. Course appraisals were pioneered with a sample questionnaire prepared on physiology, and suggestions were made for the future work which would take three weeks instead of three months per survey, thanks to the efficient ground work. The staff adviser system was appraised via questionnaire and endorsed as necessary, and several suggestions were made which might be incorporated.

Suggestions were made for improvements to the Medical Society office, the redecoration of the Women's Common Room, and the duplicating of free exam reprints for all years. The Committee were in favour of establishing a medical residence.

The Annual Staff-Student Smoker was a success thanks to our speaker, Professor John Mann.

Our campus prestige has never been higher thanks to Dave Price, our second consecutive representative to the Students' Administrative Council to be President, and Doris Kerr who headed the Carabin weekend exchange. Eight Medsmen took part in this weekend.

We are also very proud of Bruce Stewart who directed the Hungarian Committee which taught, clothed, and fed our newly displaced students.

The final year was honoured by having among its number a Rhodes Scholar, Hesh Rotman, and by the fact that nine of its members received SAC Honour Awards—quite an achievement.

The main contribution of the Medical Alumni Association to undergraduate students is made in the form of scholarships, bursaries, and loans. A new innovation is the emergency short-term, interest-free loan fund, and the Alumni are working on a long-term, large-sum guarantee plan with the banks. The Alumni also sponsored the general practice forum and a graduation banquet with the fifty-year graduates being present. The Committee on Student Loans under the direction of Dave Price, Gord Forstner, and Rich Bethune has influenced the Alumni to change their policy regarding loans and the government's new proposals also agree quite markedly with their suggestions.

A Socialized Medicine Committee was created to inform students about our present status relating to government health schemes. Its existence will enable action if an opportunity arises.

In the annual elections candidates were vigorously solicited for all positions and the campaign was much more enthusiastic than usual. The Hart House performance was enhanced by a programme of planned entertainment.

The unfaltering enthusiasm maintained by everyone is gratefully acknowledged and it is impossible for me to express my full appreciation for the personal support I received. All I can say is "thank you" to all concerned, especially the year presidents. It is with a feeling of confidence that I wish Doug Wilson and the new Assembly every success.

R. C. Bull

Medical Athletic Association

(September, 1957, to June, 1958)

Honorary President	Dr. MacAllister Johnston
President	Robert Macdonald
Vice-President	Albert Cecutti
Secretary-Treasurer	John Henderson
Publicity Director	Peter Wyshynski
Quartermasters	Elgin McCutcheon
	Glen Taylor
IV Medical Representative	Robert Shortread
III Medical Representative	Harry Hall
II Medical Representative	Gordon Sellery
I Medical Representative	David Berger
II Premedical Representative	Barry Cutler
I Premedical Representative	James King

During 1957–8 the Medical Athletic Association enjoyed a very successful year with wide student participation in intramural and intercollegiate sports. The Faculty's name was well represented on the intercollegiate scene by such notable performers as Larry Joynt, Varsity Blue Quarterback; Dave Stevens, Varsity Hockey; Harold Rotman, Varsity Basketball; and Bill Yorzyk, Swimming. Three intramural championships were won this year and two other possible championships were not decided until the final day of the schedule.

It is interesting to note that two of our championship teams were made up entirely of members of the second medical year. This year won championships in both volleyball and basketball. With two more undergraduate years remaining for these students, we should be able to look forward to a repeat performance.

The Faculty golf tournament held at the Elms Golf Club during the first week of October initiated our fall sports programme and provided an afternoon of enjoyable exercise for those who attended. Bob Knowlton captured the low gross trophy, and Bill Stager took the low net trophy. Other forms of physical endeavour, such as tennis, track, lacrosse, and soccer, provided the students with the necessary outlets to balance their academic programme. However, the highlight of the fall season was the almost unprecedented march of the medical football team to the Mulock Cup semi-finals at Varsity Stadium. With 80 per cent of the student body in the stands and a good staff representation headed by the Dean himself the team was cheered on to a great display of sportsmanship and courage. And although we did not go on to win the Mulock Cup, the showing of the team and the fan support raised the prestige of the Faculty of Medicine throughout the campus.

Our winter sports centred around hockey, basketball, swimming, waterpolo, and

squash. Basketball was particularly popular this year as witnessed by the fact that three of the major teams reached the finals and one of the minor teams took the championship. Squash also showed a rejuvenation as we had a record number of teams entered. The students representing Medical Athletics at the Winter Carnival, held at Caledon, amassed a sufficient number of points to take first place.

The Medical Athletic Association Banquet, held at Chez Paree on March 17, brought to a close a happy and successful year. Dr. M. W. Johnston, our Honorary President, delivered an entertaining speech and helped to present the trophies. Dr. R. I. Macdonald, representing the faculty, presented the record number of fifty First Colours. Warden McCulley, representing the University, presented the championship awards. Mr. A. C. Cecutti and Mr. D. R. Wilson were awarded executive keys, and Mr. R. E. Macdonald was awarded the Athletic Stick to be presented at the Graduation Banquet.

ROBERT E. MACDONALD

Medical Women's Undergraduate Association

(September, 1957, to June, 1958)

Honorary President	Dr. Joan Vale
President	Vera Heller
Vice-President	Sally Saunders
S.A.C. Representative	Doris Kerr
Treasurer	Frances Lettau
Secretary	June Clark
Social Convener	Susan Atack
Common Room Warden	Mary Jane Ashley
President, M.W.A.A.	Margaret Norman

The activities of the Medical Women's Undergraduate Association again fulfilled five main functions: namely, to provide social activities; to provide opportunities to meet medical women graduates; to maintain a common room; to sponsor an athletic programme; and to form a link with students of other colleges and faculties.

We were very fortunate this year to have Dr. Joan Vale as our Honorary President. Dr. Vale was keenly interested in our activities and attended several herself despite her own busy schedule. She has been responsible in the past for planning informative forums for the girls, and this year she organized an evening for us with the women members of the Medical Alumni Association of the University. We are very grateful to her for her interest and friendship.

The activities of the year included several social functions. On the evening of registration day, the girls of the final year entertained twenty-two new girls of the Faculty at the home of Miss June Clark. In October, the annual Initiation Banquet was held at the Northgate Hotel. Dr. R. F. Farquharson was our distinguished guest speaker, and his topic, "Medical Interests in Non-Medical Writing," was highly entertaining and inspiring. The Annual Christmas Party was held just before the holidays in the Duncan Room. A large number of Christmas presents were collected for the children of the University Settlement House. In the spring, a tea in honour of the graduating year was held at the home of Miss Susan Atack. The highlight of the afternoon was provided by the third medical year girls, who presented a poem about each graduate and an original and humorous skit.

During the year there were opportunities to meet medical women graduates. Approximately forty graduates attended the annual Initiation Banquet. Later in October the National Federation of Medical Women in Canada held a tea for the girls of the Faculty at Burton Hall. The afternoon included a tour of the Women's College Hospital. The feminine section of the Medical Alumni Association of the University held an informative evening for the girls at the University Women's Club.

Four guest speakers, representing different fields of medicine, expressed their views on how to prepare for, and to begin practice in, various fields of medicine. In March, the graduating year was honoured at a banquet given by the National Federation of Medical Women (Ontario Division) at the Granite Club.

A great effort was made to improve the condition of the girls' common room in the Medical Building. In the early fall, the girls of the second premedical year sewed slipcovers for the furniture. Later, a candy sale was held to start a fund for the purchase of new carpeting. Despite these efforts the common room still looked very shabby, but at the end of the year we received a very generous grant of five hundred dollars from the Medical Society Assembly which will be used to purchase new furniture. A tiled floor and new drapes are projects for the future, and we hope that in the next few years the renovation of the common room will be completed.

The girls' athletic programme was under the competent direction of Miss Margaret Norman. Her energetic leadership for the past two years has been largely responsible for the continued enthusiasm in sports. We were very happy to learn that she received a silver award for her contribution to women's athletics on the campus.

Miss Doris Kerr was our capable representative on the Students' Administrative Council. She was elected co-chairman of the Weekend Exchange Committee and was responsible for the great success of the Carabin Weekend, an exchange weekend with students from the University of Montreal. Her endless efforts and excellent work received high praise.

The year's projects and activities were all enthusiastically received and well supported. I am personally very grateful to the out-going executive for their energetic spirit and fine work. We wish the new executive every success in their work next year.

VERA HELLER

Medical Women's Undergraduate Athletic Association

President	Margaret Norman
Vice-President	Shuko Kamitakahara
Treasurer	Sylvia Kennedy
Secretary	Mary Trotter
I Premedical Representative	Inara Grava

Enthusiasm for team sports was high, particularly basketball and ice-hockey. The basketball team lost the play-off for leadership in its league, while the hockey team tied for leadership in its league. More than enough people to make up full teams came out, and it is hoped that all these people will turn out again next year. The volleyball and baseball teams did better this year than in the past although they did not head their leagues. A small but enthusiastic group had a good time at a badminton night run by the M.W.U.A.A.

Entrants from Medicine placed third in the indoor archery meet, and Medicine was also represented on the Intercollegiate Basketball team and the Women's Athletic Directorate of the University.

The final event of the year was the Banquet held on March 18. The team coaches were honoured at this time; and one Premeds bar, two Medical M's and the following university colours were awarded: one third colours, one Junior T, two Senior T's, and one citation to a senior T. The highlight of the evening was a talk given by Dr. J. H. Ebbs entitled "Adventures Encountered in the Practice of Medicine," and illustrated by coloured slides taken all over the world.

Again the activities fulfilled the recreational needs of the athletically minded women in the Faculty and this year's executive sends its good wishes for the same enthusiasm and co-operation to next year's executive.

MARGARET G. NORMAN

Science and Medicine Division of the University Library

Reported by Mrs. M. Galt

The continued interest of the Faculty in keeping the collection abreast of the times has resulted in an increase in the use of the clinical material, particularly by the postgraduate medical group.

Subscriptions to new journals in special fields have greatly added to the value of the already excellent periodical section. The growing use of the current material is a great satisfaction to all concerned.

The recent purchase of a number of selected Russian periodicals (in translation) and an abstracting service should be of great interest to many of the staff. This material is not available elsewhere in Toronto.

The circulation figures of medical books and journals were as follows:

To undergraduates	21,800	(an increase of 4 per cent)
To Faculty members and graduates	6,049	(an increase of 6 per cent)
Current periodicals	3,934	(an increase of 17 per cent)
TOTAL	31,783	(an increase of 5 per cent)

REPORT ON REGISTRATION, SESSION 1958–9

First premedical year	128
Second premedical year	119
First medical year	163
Second medical year	152
Third medical year	139
Fourth medical year	147
Occasionals	6
Art as Applied to Medicine	2
Bachelor of Science (Medicine)	4
Diploma in Medical Radiology	16
Diploma in Psychiatry	42
Diploma in Public Health	21
Diploma in Industrial Health	4
Graduate students (including 51 in the Advanced Graduate Course)	302
	1,245
Physical and Occupational Therapy	173
	1,418

FELLOWSHIPS, SCHOLARSHIPS, MEDALS, AND PRIZES

Awarded at Convocation, June, 1958

GRADUATE

George Brown Memorial Scholarship	B. Langer, M.D.
William Goldie Prize	C. Ezrin, M.D., F.R.C.P.(C)
Dr. Arthur F. Haasz Fellowship	J. R. Wherrett, M.D., C.M.
Arch Hutchison Fellowship	R. E. Brown, M.D.
Frances Esther Hutchison Fellowship	R. Volpe, M.D., F.R.C.P.(C)
Lister Prize	W. R. M. Lindsay, B.Sc., M.D., F.R.C.S.(C)
Minister of Health Gold Medal	D. B. Coates, M.D.
O'Keefe Fellowships in Oto-Laryngology	W. H. Johnson, B.Sc., Ph.D. J. Farkashidy, M.D.
Starr Medals	J. W. Meakin, M.D., C.M., M.A. O. Sirek, M.D., M.A., Ph.D.

UNDERGRADUATE

Fourth Medical Year

Cody Gold Medal	G. D. Blenkarn
Cody Silver Medal	H. H. Rotman

Cody Silver Medal	Miss M. G. Norman
Dr. Benjamin W. Appleton Prize in Psychiatry	G. S. Bartlett
Butterworth Prize	D. C. Price
Chappell Prize in Clinical Medicine	H. H. Rotman
Dr. Jacob Goldstein Scholarship in Obstetrics and Gynaecology	M. M. Fisher
Hendry Memorial Scholarship	D. R. Hopkins
Medical Alumni Association Scholarship	G. G. Forstner
Ellen Mickle Fellowship	G. D. Blenkarn
Ontario Medical Association Prize in Preventive Medicine	Miss M. G. Norman
Dr. Roy Simpson Scholarship in Paediatrics	G. S. Bartlett G. G. Forstner
Starkman Scholarship	H. H. Rotman

Third Medical Year

Franckel Memorial Award	Mrs. L. E. Sutherland
J. F. Hartz Company Prize in Ophthalmology	Miss G. B. Pierce
J. F. Hartz Company Prize in Oto-Laryngology	Miss G. B. Pierce
Frank W. Horner Gold Medal	L. W. White
Ronald S. Saddington Medal in Pathology	Mrs. L. E. Sutherland
Dr. Alexander McPhedran Award	G. S. Lansky, D. E. Warkentin } Aeq.
Samuel Rotman Scholarship	D. R. Wilson
Starkman Prize in Pharmacology and Therapeutics	H. Schachter
Starkman Scholarship	D. R. Wilson

Second Medical Year

John Copp Bursary	R. L. Joynt
Posluns Brothers Scholarship	J. Schatzker
Sandoz Prize in Pharmacology	R. E. Mathews

First Medical Year

Starkman Scholarship	N. V. McPhail
John Zoberman Scholarship	L. M. Jerry

Second Premedical Year

Famous Players Canadian Corporation Scholarship	A. W. Karr
Modern Medicine of Canada Prize	J. G. Ashby

Anaesthesia

Under the direction of Professor S. M. Campbell

When the policy of reducing the number of lectures in the Faculty was instituted two years ago, the course in Anaesthesia in the third year was reduced from sixteen hours to eight. Unfortunately, this was further cut to seven because of the Thanksgiving holiday in the first term. This is in part compensated for by the third year students, in pairs, spending two afternoons in the nose and throat operating rooms at the Hospital for Sick Children where instruction is given in open ether anaesthesia.

The fourth year students in groups of five or six received six one-hour clinics in anaesthesia while on their surgical quadrimester and each student in turn worked with his clinician for one week on both private and public cases. This method of individualized teaching has been most effective and has provided a closer student-teacher relationship. Oral examinations were given at the end of each surgical quadrimester.

The two-year postgraduate course has had twenty-one men and women registered from Canadian, British, and American universities. Many more applicants have had to be refused, but there will be a gradual increase in the number of acceptances in keeping with the enlargement of the teaching hospitals. There are also five third year appointments. The number of requests for training received from Greece, Turkey, and the Arab states is giving some concern because of our

inability to fulfil them although it is realized that from the standpoint of maintaining friendly international relations and raising the standards of medical care in those countries we should take some responsibility.

The co-operation received by the Department of Anaesthesia from the basic science and other clinical departments in carrying out the teaching programme has been excellent, and it is appreciated very much. Owing to the increasing necessity for greater laboratory facilities for teaching and research there has been established a committee under Professor R. A. Gordon to enquire into ways to bring this about, especially with regard to the advisability of setting up an anaesthetic research laboratory.

One member of the Department, Dr. Anita Beaton, has been working in the afternoons in the Department of Pharmacology on the cardiac effects of Fluothane and one postgraduate student, Dr. J. W. Reingwertz, has been working full time in pharmacology on problems in respiration under a grant from Burroughs Wellcome and Company (Canada) Limited. These will both be reported by Professor Cullumbine, Department of Pharmacology.

On August 30, 1957, the sudden death occurred of Dr. William Easson Brown who had just retired the previous year from the Department. Dr. Brown had contributed greatly to the research and teaching in the Department, and to the Athletic Society of the University, and his loss saddened us all.

Members of the staff have attended many scientific meetings and have given the following papers and addresses:

Dr. Michael Campbell, "Experiences in Postgraduate Anaesthetic Training in Great Britain," at the Academy of Medicine, Toronto; Dr. H. B. Fairley, "Carbon Dioxide in Modern Perspective," at the Academy of Medicine, Toronto, "Assessment of the Patient with Cardiovascular Disease for Surgery," to the Ontario Division, Canadian Anaesthetists' Society, Hamilton, October, 1957, "Current Adjuncts in Cardiovascular Surgery," Hartford, Connecticut, May, 1958; Dr. A. J. Dunn, "Recent Trends in Anaesthesia," at the district Ontario Medical Association Meeting, Gravenhurst, January, 1958; Dr. Paul Bailey, "Muscle Relaxants," Ontario Medical Association Annual Meeting, Toronto, May, 1958; Dr. Shirley Fleming, "Place of Epidural Anaesthesia on the Obstetrical Service of the Toronto General Hospital," at the Thirty-second Annual Congress of the International Anaesthesia Research Society, New Orleans, March 24, 1958; Dr. R. A. Gordon, "Anaesthesia for Mass Casualties," Canadian Civil Defence College, Arnprior, Ontario, November, 1957, and March, 1958, "Incidence of Regurgitation and Aspiration in Anaesthesia and Methods of Treating the Aspiration Syndrome," Annual Meeting of the Canadian Anaesthetists' Society, Montebello, Quebec, June 25, 1958; Dr. I. M. MacKay, "Clinical Use of Fluothane," at the Annual Meeting of the Ontario Medical Association, Toronto, May, 1958; Dr. S. L. Vandewater, "Problems in Anaesthesia and Hypothermia for Neurosurgery," at the American Academy of Neurosurgery, Sea Island, Georgia, November 11, 1957, on "Observations on the Sheep Foetus during Hypothermia," to the section of Obstetrics and Gynaecology of the Royal College of Physicians and Surgeons, Montreal, October, 1957; Dr. Leonard Weston, "Active Treatment of the Patient in Acute Haemorrhagic Shock," to the Section on Anaesthesia of the Ontario Medical Association Annual Meeting, Toronto, May 15, 1958.

Research

Members of the staff have undertaken the following research work:

Professor S. M. Campbell has completed a clinical study of the analgesic and hypnotic effects of dipipanone hydrochloride.

Dr. H. Barrie Fairley, with the assistance of a grant from the J. P. Bickell Foundation, has carried out a study of pump oxygenators and complications arising from their use in open heart surgery on animals in developing a technique of anaesthesia which is now in use clinically for the Department of Cardiovascular Surgery under Dr. W. G. Bigelow. It is expected that further investigations of pulmonary function

and metabolic changes during anaesthesia for cardiac surgery will be carried out on patients in the coming year.

Dr. Iain MacKay, working with Professor Werner Kalow in the Department of Pharmacology, has been evaluating the various vaporizers manufactured for the use of "Fluothane," both in the laboratory and in the operating room.

Dr. S. L. Vandewater, with Dr. W. M. Lougheed, has continued investigations on animals under a National Health Grant on hypothermia and hypotension as related to subarachnoid haemorrhage. Also, in collaboration with Dr. W. M. Paul of the Department of Obstetrics and Gynaecology, Dr. Vandewater has studied the effects of hypothermia on pregnant animals. Dr. Vandewater is carrying out a study of one thousand consecutive unselected operative patients for incidence, cause and treatment of hypotension during surgery and in the early postoperative recovery period.

Dr. R. A. Gordon and Dr. Brian Marshall have been studying the incidence of regurgitation and aspiration during anaesthesia and methods of treatment of the aspiration syndrome.

Publications

Gordon, R. A. "Teaching of Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 4, no. 3, July, 1957, pp. 183–4).

Junkin, C. I., Smith, C. and Conn, A. W. "Fluothane for Paediatric Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 4, no. 3, July, 1957, pp. 259–64).

MacKay, I. M. "Clinical Evaluation of Fluothane with Special Reference to a Controlled Percentage Vaporiser" (*Canadian Anaesthetists' Society Journal*, vol. 4, no. 3, July, 1957, pp. 235–45).

Smith, C., "Methitural Sodium for Induction of Paediatric Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 4, no. 4, pp. 378–84).

Smith, C., Rowe, R. D. *et al.* "Sedation of Children for Cardiac Catheterization with an Ataractic Mixture (*Canadian Anaesthetists' Society Journal*, vol. 5, no. 1, Jan., 1958, pp. 35–40).

Vandewater, S. L. "Report of Two Cases of Cardiac Arrest during Induced Hypotension" (*Canadian Anaesthetists' Society Journal*, vol. 5, no. 3, June, 1958, pp. 355–7).

Vandewater, S. L., Lougheed, W. M., Scott, J. W., and Botterell, E. H. "Some Observations with the Use of Hypothermia in Neurosurgery" (*Anesthesia and Analgesia*, vol. 37, no 1, Jan.-Feb., 1958, pp. 29–36).

Anatomy

Under the direction of Professor J. W. A. Duckworth

During the year 1957–8 there were 843 undergraduate and graduate students working in the Department of Anatomy. They were distributed among thirty different courses mentioned below:

Undergraduate Courses in Gross Anatomy and Neuro-Anatomy

1.	Medical, first year	158
	Art as Applied to Medicine	—
	Teachers' Course, Physical and Occupational Therapy	—
2.	Dental, first year	80
3.	Physical Anthropology	110
4.	Physical and Occupational Therapy, first year	70
5.	Physical and Occupational Therapy, second year	61
6.	Physical and Occupational Therapy, third year	59
7.	Physical and Health Education, first year	42
8.	Physical and Health Education, second year	42
9.	School of Embalming, first year	39
10.	School of Embalming, second year	38
11.	Dental Hygiene, first year	14
		713

GRADUATE COURSES IN GROSS ANATOMY

12. Surgery	5	
13. Radiology	5	
14. Anaesthesia	9	
15. Neuro-anatomy	25	
16. Ophthalmology	4	
17. Oto-laryngology	11	
18. Dentistry	5	
19. Demonstrators in Gross Anatomy	4	
20. Advanced Graduate Course in Surgery	25	
21. Advanced Graduate Course in Obstetrics and Gynaecology (Autumn)	9	
22. Advanced Graduate Course in Obstetrics and Gynaecology (Spring)	9	
23. School of Graduate Studies	4	
		115

UNDERGRADUATE COURSES IN HISTOLOGY

24. Medical, first year (included in item 1)	158	
25. Dental, first year (included in item 2)	80	
26. Physical and Occupational Therapy, first year (included in item 4)	70	

GRADUATE COURSES IN HISTOLOGY AND CYTOLOGY

27. Graduate Dental Histology	6	
28. Graduate Histology	6	
29. Demonstrator in Histology	1	
30. Special Cytology	2	
		15
		843

During this year the following changes were made in the courses of instruction:

In the laboratory course in physical anthropology, given in conjunction with the Department of Anthropology, to the first premedical year, each student was assigned two research projects and was required to hand in reports on his work. The value of this type of work in encouraging the student to observe, record, and interpret facts for himself was proved by the number of excellent studies which were handed in.

In the teaching of histology to the first medical year the study of sections was facilitated by the introduction of viewing boxes, in which microphotographic colour transparencies of sections were displayed. In addition, two student-demonstrators, who had recently completed the histology course, were appointed to work in conjunction with the graduate demonstrators, and proved very successful.

In November, 1957, Dr. J. E. Anderson delivered a paper to the Medical Group of the Newman Club on "Evolution in Anatomy," and in February, 1958, he gave a paper to the Faculty of Queen's University, Kingston, on "Anatomical Contributions to the Study of Man."

During the year Dr. S. H. Bensley gave the following papers: in July, 1957, to the Ninth International Congress on Rheumatic Diseases, "The Significance of the Histophysiology of the Connective Tissues in the Rheumatic Diseases"; in June, 1958, to the National Convention of the American Society of Medical Technologists, "The Scope and Limitations of Histochemistry"; and in the same month, a paper to the Medical Alumni Association of the University of Chicago, "Experimental Studies on Familial Angioneurotic Oedema."

In May, 1958, Dr. A. F. Howatson delivered the Annual Lecture to the James A. Gibson Anatomical Society, University of Buffalo, School of Medicine, on "The Newer Knowledge of the Structure of Normal and Malignant Cells Obtained by Electron Microscopy."

In June, 1958, Dr. T. S. Leeson gave a paper at the First Annual Congress of the Canadian Federation of Biological Sciences on "The Fine Structure of the Mesonephros of the Embryonic Rabbit."

Research

Members of the staff have undertaken the following research work:

Dr. J. E. Anderson has: (1) continued his studies on the physical anthropology of the Iroquois Indians by analysis of the data from the skeletons of Faherty site ossuary; (2) carried out studies on ancient and modern vertebrae, noted the relation between cervical arthritis and occlusion of the foramen for vertebral artery in the cervical transverse processes; (3) organized a comparative osteology collection of mammals with a scheme for their identification, which should prove valuable both to students of comparative anatomy and also in medico-legal work.

Continuing work on the phenomenon of cell alteration in tissue culture, Dr. A. A. Axelrad has shown that the cells of an altered line in continuous culture, when injected into newborn mice belonging to the strain of origin of these cells, grew as malignant tumours, leading to the early death of nearly all the mice injected. The same cells rarely gave rise to tumours in adults of the same strain, showing that an immune mechanism in the host, developing after the first day of life, is capable of preventing the growth of these malignant cells.

Recently Dr. Axelrad has developed a technique for studying the chromosomes of leukaemic cells taken directly from the animal and has found that in several "spontaneous" and several virus-induced leukaemias in mice the number of chromosomes is abnormal and this number may vary from cell to cell. This suggests that an interference with the genetic mechanism of the cell may be an important feature of this disease.

Dr. S. H. Bensley continued her studies on the fibrous connective tissues, with the aid of a grant from the Banting Research Foundation, along three lines. (1) Physical and chemical changes in the intercellular substances. It was found that after application of histamine and hyaluronidase in the mouse and in alloxan diabetes in the rat there was an hydrolysis of the ground substance, fraying of the fibres, and a consequent loss of hydration of the intercellular substances. (2) Relation of mast cells to changes in the intercellular substances. It was observed that mast cells developed *in situ* following changes in the intercellular substances described above. These cells developed by incorporating into the cytoplasm in the form of granules the modified substances in their environment. (3) The effects of an alkaloid, extracted from taxus canadensis, on the peripheral progressive oedema produced in mice by histamine plus hyaluronidase. It was found that this alkaloid, "Taxenin," reversed and prevented many of the local and systemic effects of histamine and hyaluronidase.

In collaboration with Dr. Madeline Maykut of Pharmacology, studies were carried out on the microscopic effects of long-acting local anaesthetics on the sensory nerve fibres of cutaneous nerves of guinea pigs. This study revealed that many of the sensory fibres were still damaged after more than an hour after the return of sensation in the skin, and that, in general, the regeneration of damaged sensory fibres was more rapid and complete with the less toxic anaesthetics.

Dr. W. G. Bruce Casselman and Dr. Keith F. A. Ross developed techniques for studying living muscle cells by interference microscopy, using either the A.O.-Baker or the Cooke-Dyson instrument. An improved method was also devised for the preparation of isotonic media of various refractive indices for use in these studies. Investigations are in progress comparing the muscles of genetically dystrophic mice and their normal litter-mates. The results indicate definite differences in the concentrations of solids in the A- and I-bands of the two groups. Dr. Casselman completed his studies of hepatoma and ascitic tumour cells by interference microscopy and histochemical techniques. Dr. Ross, with the co-operation of Dr. E. A. McCulloch of the Department of Medicine, continued studies which he commenced in England on microscopical refractometry of erythrocytes as a clinical diagnostic technique.

Dr. J. W. A. Duckworth has continued his investigations with the post-natal development of the sinu-atrial and atrioventricular nodes in man, and has also been studying the pathways of the conducting tissue bundles in the various types of congenital heart defect.

Dr. A. F. Howatson has continued his electron miscroscope studies of tumour cells with particular reference to virus-infected cells. Virus-like bodies have been discovered in a transplantable mouse plasma cell tumour. Studies on the identification and properties of this presumed virus are being carried out. The fine structure of cells growing *in vitro* under various conditions and changes in cell morphology occurring after exposure to large doses of X-ray and after infection with certain viruses have been investigated.

Dr. T. S. Leeson, who was awarded a British Medical Association Research Scholarship for 1957–8, has been engaged on the study of the fine structure of the mesonephros and metanephros of the rabbit. The results to date are as follows. (1) The mesonephric glomerulus shows a fine structure when fully developed which is practically identical with that of the adult metanephros. From the structural point of view it appears capable of the same filtration function as the adult metanephros. (2) The mesonephric tubule also shows marked similarity to that of the metanephric, but the similarity is not so great as in the case of the glomerulus. The tubules show marked intercellular clefts, extending from the lumen deeply to the basement membrane, a finding which has already been reported in the bladder mucosa. (3) There appears to be some anomaly in the mesonephros: whereas the glomerulus is so fully differentiated as to seem capable of function, the tubule does not show so complete a differentiation.

Dr. I. A. D. Todd, under the direction of Dr. W. R. Harris, has continued with the work started during the previous year, using the quartz rod illuminator for the study of fat embolism *in vivo*, and histological methods for the study of the effects of the intravenous injections of fat. The fat injected was mainly of the neutral variety, and studies were carried out after sub-lethal doses. The progressive changes which take place in the organs of the rabbit—particularly the lungs and kidneys—have been observed and recorded. It would appear that neutral fat, when held up in the pulmonary vessels, remains there and incites a mononuclear inflammatory cell reaction producing small granulomata. The fat remains neutral until it becomes crenated and appears to be engulfed by the granuloma, at which time, using nile blue sulphate stain, it appears to be mainly acidic. No evidence has been found to support the suggestion that acidic fat is released systematically, leading to the well-known symptomatology of the disease. In the kidney, fat appears to be held up in the glomerular capillaries within minutes of its injection into the ear vein, suggesting that it has escaped from the bulk of the fat held up in the pulmonary bed. This fat also remains neutral, for as long as it has been followed, and seems to incite only a minimal reaction. In addition the histological changes following fractures across the epiphyseal plate are being studied.

Publications

Axelrad, A. A. and McCulloch, E. A. "Obtaining Suspensions of Animal Cells in Metaphase from Cultures Propagated on Glass" (*Stain Technology*, vol. 33, 1958, p. 67).

Duckworth, J. W. A. "The Embryology of Congenital Heart Disease"; in *Heart Disease in Infancy and Childhood*, by J. D. Keith, R. D. Rowe and P. Vlad, pp. 106–28. New York: Macmillan Co. 1958.

Ham. A. W. *Histology*. Third ed. Philadelphia: J. B. Lippincott Co. 1957. Pp. 894.

——— "How to Study More Effectively" (*Canadian Medical Association Journal*, vol. 78, April 1, 1958, pp. 482–5).

——— "The Newer Knowledge of the Structure of Normal and Malignant Cells Obtained by Electron Microscopy" (*Annual Report of the Ontario Cancer Treatment and Research Foundation*, vol. 57, 1956, pp. 18–29).

Howatson, A. F. and Ham, A. W. "The Fine Structure of Cells" (*Canadian Journal of Biochemistry and Physiology*, vol. 35, no. 7, July, 1957, pp. 549–63).

Howatson, A. F. and McCulloch, E. A. "Virus-like Bodies in a Transplantable Mouse Plasma Cell Tumour" (*Nature*, vol. 181, 1958, p. 1213).

Leeson, T. S. *et al.* "Observations on the Histochemistry and Fine Structure of the Notochord in Rabbit Embryos" (*Journal of Anatomy*, vol. 92, part 2, April, 1958, pp. 278–85).

Art as Applied to Medicine

Under the direction of Miss Maria T. Wishart

The number of staff members using the service branch of this Department shows an increase of over 25 per cent. With good co-ordination of staff work and up-to-date equipment we continue to show an increase in the volume of work turned out each year. The use of the 35-mm. camera has increased the demand for colour. We welcome this for colour enhances the illustration by adding yet another dimension.

Miss Elizabeth Blackstock completed a series of illustrations in colour for Dr. D. R. Mitchell, Department of Surgery, on "Experiences with Fractured Pelvis and Dislocation of the Prostate," shown at the Canadian Medical Association Meeting, Halifax, June, 1958. Miss Blackstock continues to record a variety of Ophthalmological studies.

Mrs. Mary Murphy completed three illustrations of the blood oxygenator for the Cardio-vascular Unit, a black and white for publication, a working drawing to scale for the manufacturer, and an interesting three-dimensional wall chart in colour. Mrs. Murphy has also carried out black and white illustrations on "The Mobilization of the Stapes" for Dr. G. A. Fee of the Department of Oto-laryngology and a series of illustrations in colour for Dr. P. Moloney, Connaught Medical Research Laboratories, and Dr. C. Ezrin, Department of Medicine, on "Acquired Resistance to Insulin due to Neutralizing Antibodies," shown at the Meeting of the Royal College of Physicians and Surgeons, Montreal, in October.

Miss Blackstock's studies in the rendering of transparencies and three-dimensional microscopic drawings continue to add greatly to the value of illustration.

Mrs. Murphy is experimenting with various combinations of new techniques in colour.

Following last year's experimentation with rubber compounds, Miss M. T. Wishart, with Mrs. M. Hull and Miss McCollum (third-year students in Art as Applied to Medicine), completed a latex model of the heart, one and a half times life size. The interior of the heart is revealed by two open windows which permit demonstration of the location of atrial and ventricular defects.

In October, Miss Wishart, Miss Blackstock, and Mrs. Murphy attended the twelfth annual meeting of the A.M.I. held at McGill University, Montreal. Miss Wishart took part in a panel discussion on the "Education of the Medical Illustrator."

Three students obtained their diplomas in Medical Illustration this year. Among these, one has received an appointment with Dr. J. V. Basmajian, Professor of Anatomy, Queen's University. For 1958–9, three students have been accepted, one of whom comes from Johannesburg, South Africa. Dr. J. W. A. Duckworth has kindly given advice and loaned material to assist in preparing these students for the study of anatomy. A number of other applicants for the following years have been entered for a special preparatory two-year course at the Ontario College of Art.

Bacteriology

Under the direction of Professor Philip Greey

The undergraduate teaching programme was continued as in the previous year.

Dr. J. C. Sinclair and A. E. Franklin, Ph.D., gave eight lectures to the second medical year students on virus infections. These lectures have been integrated with the instruction on hygiene and preventive medicine. Dr. Franklin was awarded a medical Research Associateship by the National Research Council, Ottawa.

Research

Members of the staff have undertaken the following research work:

Dr. R. M. Price is investigating several atypical strains of acid-fast bacilli recently isolated from human sources. She is continuing her interest in vaccination against tuberculosis in both adults and children.

Dr. G. H. Hawks, at St. Michael's Hospital, with Dr. J. H. Wilson, is proceeding with his study of antistreptolysin titres in people with rheumatic fever, with various other clinical conditions, and those in apparent good health.

Dr. T. E. Roy, at the Hospital for Sick Children, is carrying on his investigation of the problem of nasal carriage of staphylococci. In this connection they are studying the serology of staphylococci; antibiosis between strains normal in the nares and replacing strains; the role of lysogenic staphylococci as strains replacing the normally carried staphylococci; and differences in the nasal mucosa (ciliated cells) between carriers and non-carriers.

The study of cat scratch disease continues in co-operation with Dr. W. B. Spaulding, Department of Medicine. A large supply of material suitable for skin testing is kept on hand. Miss Hennessy is endeavouring to isolate the causative agent by tissue culture techniques using a wide variety of cell lines.

Dr. Greey has been interested in possible sources of bacterial contamination in nurseries for premature infants. He has shown that the water tanks of isolettes, even though refilled with sterile distilled water, may collect sufficient organic matter to permit luxuriant growth of certain bacteria. The same change may occur in the water used for the vapojets. This has been demonstrated for *Pseudomonas aeruginosa* and for a flavobacterium. It is suspected, though not proven, that a paracolon bacillus, known to be pathogenic for premature infants, may under certain circumstances also flourish in these containers since this micro-organism grows readily in distilled water containing traces of organic matter.

Under the direction of Dr. H. L. Ormsby, Department of Ophthalmology, studies were continued on the problem of latent herpes simplex virus in eyes previously infected. Mrs. A. Fowle has experimented with various methods of reactivating latent infection and through neutralization and complement fixation tests has studied the level of serum antibody.

Dr. J. C. Sinclair and his group have continued their studies on the isolation and identification of the agents of infectious hepatitis and serum hepatitis. Drs. J. C. Sinclair and S. J. Weyman have investigated outbreaks of infectious hepatitis in the Curve Lake Reserve (near Peterborough), the Red Lake Improvement District, Timagami, and Sudbury. Follow-up surveys have been carried out in the Elliot Lake area. Dr. A. E. Franklin has succeeded in maintaining lines of cells from biopsy specimens of liver and spleen through many passages. The liver line was successfully carried for as long as 299 days and that from the spleen for 341 days. Preliminary tissue-culture experiments have indicated that corticosteroids under certain conditions could depress the growth of fibroblast-like cells. Limited infection experiments with acute stage faecal extract failed to yield significant results when tested on human adult liver cells, Hela cells, and trypsinized monkey kidney epithelium. Miss B. K. Buchner, assisted by Miss Snyder, has performed haemagglutination tests through a wide pH range on various specimens in the acute stage. As well, Miss Buchner, in association with Miss Gipter, has tested extracts, after oyster concentration, by the complement fixation procedure, but no significant results were obtained. In co-operation with Dr. G. Whetmore of the Ontario Cancer Institute, infection experiments are being carried out after production of so-called giant cells by irradiation of a cell line such as Henles intestinal epithelium.

Publications

Greey, P. H. "Why Do Bacteria Become Resistant to Antibiotics?" (*Ontario Medical Review*, vol. 25, no. 1, Jan., 1958, pp. 29–34).

——— Reviews, *Canadian Medical Association Journal*, vol. 77, no. 3, Aug. 1, 1957, p. 279.

Roy, T. E. "Bacteria and Cross Infection" (*Laundry and Dry Cleaning Journal*, May, 1958, p. 20).
Roy, T. E. *et al.* "A Survey of the Incidence of Resistance to Antibiotics in Bacteria Isolated in a Children's Hospital" (*Canadian Medical Association Journal*, vol. 77, no. 9, Nov. 1, 1957, pp. 844–50).
Roy, T. E. *et al.* "Nasal Carriage of Staphylococcus Pyogenes by Student Nurses" (*Canadian Medical Association Journal*, vol. 77, no. 11, Dec. 1, 1957, pp. 1001–9).

Biochemistry

Under the direction of Professor A. M. Wynne

During the past year 260 students have received instruction in biochemistry:

Faculty of Medicine, first medical year			149
Faculty of Arts, third and fourth years, honour courses			40
Faculty of Household Science			9
Graduates enrolled as occasional students			13
Graduates enrolled in the School of Graduate Studies			49
(*a*) Major subject Biochemistry		23	
Candidates for M.A.	7		
Candidates for Ph.D.	12		
Not yet enrolled for higher degree	4		
(*b*) From other departments		26	
		Total	260

Of the twenty-three graduate students who had elected biochemistry as their major field of study, eleven are graduates of the University of Toronto. Universities represented by the other twelve students include Alberta, British Columbia, Liverpool, London, McGill, Mount Allison, Purdue, Queen's, Saskatchewan, and the American University of Beirut.

In the Faculty of Dentistry the courses in biochemistry have for a number of years been included in the curriculum of the second dental year. In 1957–8, however, no dental students received instruction in the Department of Biochemistry because in the previous session the students in both the first and the second dental years had completed their courses in biochemistry in conformity with a proposed change in the curriculum involving the transfer of biochemistry from the second dental year to the first. But the Faculty of Dentistry has decided to retain biochemistry in the curriculum of the second dental year. In 1958–9 the courses in biochemistry will therefore resume their places as part of that curriculum.

Professor G. C. Butler left the department in November, 1957, on leave of absence from the University, to take over new duties and responsibilities as Director of the Division of Biology and Health Physics, Atomic Energy of Canada Limited, Chalk River. Fortunately he has been able to come to Toronto several times during the year to discuss research problems with his graduate students.

Dr. George E. Connell has been appointed Assistant Professor of Biochemistry.

The department collaborated in June, 1958, in a course for medical graduates on clinical uses of radio-isotopes, organized by the Division of Postgraduate Medical Education. Dr. Marion Packham and Professor G. C. Butler were among the instructors, and the laboratory facilities of the Department were used for some of the experimental work.

The programme of improvement of the physical facilities of the Department has continued. Professor Hanes and his research group have moved into their new laboratories on the second floor. A remodelled and newly furnished undergraduate laboratory on the third floor was used for the first time during the past session. Another large undergraduate laboratory and a large research laboratory on the third floor have been remodelled and refurnished and are ready for occupancy. We are grateful to all who have co-operated in providing these improved facilities.

It is hoped that it will be possible during the coming year to remodel and refurnish another research laboratory and another undergraduate laboratory on the third floor, to convert one of the smaller rooms on the third floor into a reading room, and to remodel one of the rooms on the second floor for use as a seminar and tutorial room.

As a Visiting Lecturer in the School of Graduate Studies Dr. Georges N. Cohen of the Pasteur Institute in Paris delivered two lectures in the Department in January, 1958, in which he discussed his work on the stereospecific uptake of organic molecules in micro-organisms, bacterial "permeases," and certain aspects of the problem of protein synthesis. The Department was visited also by Professor Hans Neurath of the University of Washington in Seattle, who discussed informally his investigations on the configuration of the active centres of proteolytic enzymes.

It is with regret that the Department reports that Mrs. L. Lumbard, Chief Animal Room Attendant, will retire from active duty on June 30, 1958, after many years as a faithful, devoted, and efficient member of the staff.

Financial support for the research programmes carried out in the Department was provided by the Advisory Committee on Scientific Research, the Banting Research Foundation, the J. P. Bickell Foundation, the Eli Lilly Company, the Foster Bequest Fund, the Insulin Fund, the National Cancer Institute of Canada, and the National Research Council.

Research

In Professor C. S. Hanes's laboratory the study of a number of enzymic reactions has continued. An interesting result established by Mr. A. T. Matheson concerns the intracellular peptidases of kidney and liver tissues: certain of these enzymes have been shown to occur as tight complexes between the enzyme protein and ribonucleic acid, a metal ion apparently being concerned in the binding. The significance of these findings in relation to the alleged function of ribonucleic acid in protein synthesis is under investigation and Mr. T. Webb has begun work on some aspects of this question. Mr. C. K. Harris has established the existence of an inactive form of amylase in pancreatic tissue and has shown that the conversion of this precursor into the active form in tissue homogenates provides the explanation for the increase in amylase activity which other workers have interpreted as a *de novo* synthesis of the enzyme. Mr. K. A. Walsh has pursued his studies on the kinetics of enzymic group transfer reactions with a view to elucidating the mechanisms underlying this important class of reaction. Dr. M. A. Moscarello has studied various aspects of the Ehrlich ascites tumour, especially the soluble nucleotide constituents of the cells and the effects of various treatments upon the capacity of the cells to transmit the tumour to new hosts. Miss E. H. M. Wade continued her work on the development of improved chromatographic methods for the analysis of hydrolysates of proteins.

Professor G. C. Butler's graduate students have continued their studies in the general field of nucleic acids, nucleoproteins, and their metabolism. Mr. D. H. Murray concluded his study on the metabolism of isotopically labelled pentoses in relation to the nucleic acids of *E. coli* late in 1957 before Dr. Butler left the Department. Other graduate students have carried on with periodic assistance from Dr. Butler and with some help from other members of the staff. Miss R. Diringer has identified an unknown component in enzymic hydrolysates of deoxyribonucleic acid (DNA) as deoxyadenyl-deoxycytidine, resulting from the incomplete action of phosphodiesterase. She has begun a new investigation on nucleate metabolism in *E. coli*. Continuing his work on rye grass ribonuclease, K. B. Freeman has found that the enzyme degrades ribonucleic acid (RNA) to cyclic nucleotides and is affected by changes in the ionic strength of the medium. He has also made preliminary studies on some aspects of the metabolism of nucleic acids in *E. coli*. Mr. J. M. Neelin has compared by column chromatography and electrophoresis on starch gel the mixture of histones obtained from the nuclei of each of several tissues. The application of zone electrophoresis on

starch gel has, for example, effected the resolution of the histones of chicken erythrocytes and of calf thymus into twelve to sixteen bands. Mr. B. G. Lane has examined by paper chromatography and other methods the mixture of substances found in alkaline hydrolysates of RNA. Mr. M. Gold has prepared specially adapted strains of *E. coli B.* which can utilize pentoses in an improved synthetic medium as the sole source of carbon. When this medium contains either D-arabinose or D-ribose labelled at C_1 with C^{14}, the incorporation of C^{14} into both RNA and DNA can be demonstrated. The nature of this incorporation is being investigated.

Professor B. F. Crocker and his associates have continued the investigation of fundamental problems related to the biosynthesis of proteins by studying factors affecting the formation of specific enzyme-proteins in bacteria. Mr. F. M. Kahan has applied his spectrophotometric method of recording continuously the progress of action of β-galactosidase in *E. coli* to a study of factors regulating the rate of entrance of β-galactoside subtrates into the intact cell. Miss D. M. Michener has concluded her study of the relation of a galactoside-transporting system to the progress of the induced formation of galactosidase enzymes. This system appears to be active in transporting into the cell both α- and β-galactosides. Its formation is induced by both α- and β-galactosides irrespective of whether these are inducers of only α-, only β-, or of both α- and β-galactosidases. When the transporting system is present, subsequent induction of β-galactosidase follows a linear time course from the beginning. When it is absent, an autocatalytic progress curve of induction is observed. This is consistent with the view that the rate of entrance of inducer into the cell is the factor limiting the rate of enzyme formation. Mrs. H. M. Coval, on leave of absence from the Laboratory of Hygiene, Department of National Health and Welfare, Ottawa, has studied the formation of β-galactosidase in the absence of an external inducer. This condition corresponds to that under which mammalian cells are usually cultured *in vitro*. Mrs. Coval on her return to Ottawa intends to apply the techniques and concepts gained from her studies of enzyme formation in bacteria to an investigation of enzyme formation and metabolism in mammalian cells cultured *in vitro*.

Professor J. Manery Fisher and her associates have been engaged upon further studies of electrolyte movements and of metabolic processes in biological systems. With the assistance of Mrs. E. Dryden and Miss C. Lapides, Dr. Fisher has continued the investigation of the stimulation by insulin of metabolic processes and electrolyte-transport in frog muscle. These studies included measurements under different conditions of the movement of sodium and potassium and of the uptake of lactate and inorganic phosphate. It is interesting to note that even under anaerobic conditions insulin can induce an uptake of potassium by frog muscle. Continuing his study of oxidative phosphorylation in muscle mitochondria under Dr. Fisher's direction, Mr. G. J. Marcus has used a polarographic method for measuring oxygen consumption and has correlated the esterification of inorganic phosphate with the consumption of oxygen by the mitochondria during the oxidation of several metabolically significant compounds studied individually. Dr. J. W. Meakin and Mr. H. Husdan completed their work under Dr. Fisher's direction in the summer of 1957, and Miss E. A. Robertson concluded her studies on muscle mitochondria early in the academic session. Miss A. Hasner, Miss H. Mayoh and Mr. Yousef Ma'tuk began their research under Dr. Fisher's direction in May, 1958.

With the assistance of Miss V. Kask, Professor G. E. Connell has been investigating the haptoglobins of human sera. In the normal white population three types of haptoglobin can be distinguished by electrophoresis on starch gel: it is believed that the haptoglobin type of each individual is genetically determined. Dr. Connell has developed an accurate method for the estimation of haptoglobin based on the peroxidase activity of haemoglobin and of haemoglobin-haptoglobin complexes. In collaboration with Dr. O. Smithies of the Connaught Medical Research Laboratories, he has developed a method for the purification of haptoglobin which can be applied to all three genetic types. Physical and chemical studies of the structure of the haptoglobins are in progress.

Dr. T. B. Bojarski, while holding a fellowship from the National Cancer Institute of Canada, continued his studies on the intracellular distribution and specificity of action of enzymes in normal and malignant cells. He left the Department in March, 1958, to join the staff of the Cancer Research and Cancer Control Unit at Tufts University School of Medicine in Boston.

Graduate students have completed the following theses:

For the M.A. degree:

MEAKIN, J. W. The effect of insulin on the electrolytes and rate of oxygen consumption of frog muscle. III. The influence of pH, various metabolites and inorganic ions.

For the Ph.D. degree:

HUSDAN, H. The relation of electrolytes to metabolism in brain tissue.
MATHESON, A. T. A study of certain intracellular peptidases.
MURRAY, D. H. Studies of nucleic acid metabolism with radioactive isotopes.

PUBLICATIONS

SMILLIE, L. B., BUTLER, G. C. and SMITH, D. B. "Properties of Calf Thymus Histone Isolated by Three Different Methods" (*Canadian Journal of Biochemistry and Physiology*, vol. 36, no. 1, Jan., 1958, pp. 1–13).

Committee on Experimental Research

Chairman: Professor J. D. Hamilton

Supervisor: Dr. R. C. Ritchie

During the past year the common research facilities available in the Banting Institute have again been used to the full.

No major changes have been made in the animal quarters, or in the other rooms, but it is now apparent that radical changes must be considered if the expansion of the research programme is to be permitted. The operating rooms in use on the fifth floor have proved adequate, and the associated preparation and X-ray rooms are also quite satisfactory. On this floor, however, the recovery room is not satisfactory because the ventilation is poor and the room is too large. Space for housing research teams on this floor is greatly in demand, and removal of the recovery room would satisfy the immediate requirements. Within five years, double the present space will be needed. In the animal quarters more space is needed for small animals and for monkeys. The sheep have been moved from these quarters, but this only makes available one small room. The most pressing problem in the animal quarters is presented by the dogs. There are dogs in three categories, totalling approximately eighty at all times. First, there are those which are being prepared for operation; second, those which have been operated upon and are being retained for observation; and third, dogs which are being held for use in the near future by one or more of the research groups. The dogs are kept in individual cages and the room is clean, and they are well fed, but the animals should not be kept under such conditions for more than a short period of time, because no runways are available. The answer to the problem is a kennel outside the city. Preliminary explorations of this, however, have made it abundantly clear that a great deal of money will be required before we could maintain animals not immediately required outside the city. Efforts are continuing to try to find some way of keeping animals at a farm or a kennel because this would not only release space in our animal quarters, but would enable us to provide the research teams with animals in good condition. The cost in research of using animals in poor condition is very high, both in terms of time and poor results.

Again, I should like to pay tribute to Dr. R. C. Ritchie for the excellent way in which he has supervised the research facilities and the personnel, who have all continued to co-operate in assisting with the various research programmes.

Medicine

Under the direction of Professor R. F. Farquharson

Arrangements have been made for the establishment of a University Medical Service at the Women's College Hospital under the direction of Dr. Jean F. Davey. Teaching of second medical year students will begin in the fall of 1958.

The Medical Service of the Ontario Cancer Institute under the direction of Dr. O. Harold Warwick will also provide valuable teaching facilities to be used in close collaboration with the staff of the Wellesley Division of the Toronto General Hospital. This well-equipped Institute, which is primarily a radiotherapy centre, offers great opportunities for medical clinical investigation as well as for teaching.

The rearrangement of the third medical year time-table to provide four equal quarters, with more time for ward work in various departments, has proved a worthwhile change.

The introduction of Clinical Pharmacological Conferences in the final year has also been a beneficial addition to teaching in Medicine and Pharmacology.

Dr. John H. Crookston has been appointed as Clinical Teacher in Medicine and Head of the Division of Haematology and Blood Transfusion, Department of Laboratories, Toronto General Hospital. Dr. Hugh A. Smythe has been appointed as Clinical Teacher to work at the Toronto General Hospital and also at Sunnybrook Hospital.

Dr. Murray Young has been appointed Director of Laboratories, Toronto General Hospital, and Clinical Teacher in the Department of Medicine. His reorganization of the laboratory services in the hospital has been very helpful in teaching and research as well as in the routine work of the hospital.

Research

Arthritis and Connective Tissue Diseases

Drs. Wallace Graham, M. A. Ogryzlo, D. C. Graham, and H. A. Smythe, working at the Toronto General Hospital, St. Michael's Hospital, and Sunnybrook Hospital, have made good progress in continuing investigations of the effects of newer steroids and of phenylbutazone and its analogues in the treatment of rheumatic disorders; and in studies of serum proteins in health and disease and of the effectiveness of new uricosuric agents in the long-term treatment of gout. Dr. Ogryzlo has begun a more extensive study of urate metabolism in gout and has published an interesting review of his own and other work on the L.E. (lupus erythematosus) cell phenomenon. Dr. Hugh Smythe has completed a survey of the incidence of cardiac lesions in 513 patients with ankylosing spondylitis and 508 patients with rheumatoid arthritis. He has been studying the value of methods of measuring the rheumatoid factor in plasma of patients, and he has made a special investigation of a patient with agammaglobulinaemia and a disorder resembling rheumatoid arthritis.

Cardiovascular and Respiratory Disorders

Dr. Ramsay W. Gunton and his associates have continued haemodynamic studies on the effects of treatment of patients with various disorders, including shock from myocardial infarction, tricuspid stenosis, and myxoedema. With Dr. Susanne Lenkei and Dr. W. Paul (Department of Pathological Chemistry), he has applied dye-dilution techniques in the localization of septal defects and in left heart catheteriza-

tion. Two hundred left heart catheterizations have been done without serious complications (Dr. Heimbecker, Department of Surgery, and Drs. Gunton and Lenkei). A comparison has been made in thirty-six patients between the relatively simple Hamilton dye-dilution technique for measurement of cardiac output and the much more laborious Fick procedure.

Drs. C. R. Burton and K. Mitsui (Toronto General Hospital) and Dr. J. K. Wilson (St. Michael's Hospital) have continued investigation of the value of determination of serum transaminase in cardiac infarction and some other diseases. Dr. Burton has been making a survey of the varieties of branch bundle block in hospital records. Dr. Wilson has been studying functional variations in the electrocardiogram due to factors other than heart disease, and Dr. A. J. Kerwin (Toronto Western Hospital) has been investigating techniques for accurate placement of chest leads in serial electrocardiograms, and studying lead systems in vector electrocardiography.

Dr. D. P. Murnaghan (Wellesley Division, Toronto General Hospital), in collaboration with the Department of Applied Physics, continues his attempt to develop methods of improving the reproduction of heart sounds. He has also begun an investigation at the Ontario Cancer Institute and the Wellesley Division of the effects on the myocardium of deep radiation of the chest.

Drs. W. F. Greenwood and A. D. McKelvey have continued to follow carefully the results of surgical procedures in patients with mitral commissurotomy and other lesions.

Drs. R. L. MacMillan and K. W. G. Brown continue their studies of prolonged anticoagulant therapy in patients who have suffered one or more attacks of coronary thrombosis and in those with other recurrent thrombo-embolic conditions. Drs. Wilson and Brown, in collaboration with the cardiac surgeons, have continued their active interest in disorders of the aorta and peripheral vessels with special reference to indications for and results of arterial graft therapy. Dr. Wilson has found that oral administration of penicillin V in the treatment of eight cases of bacterial endocarditis is as effective as various types of parenteral therapy.

Dr. J. D. Morrow has continued a long-term investigation at the Toronto General Hospital and Sunnybrook Hospital of various methods of diagnosis and treatment of severe primary and secondary hypertension. He has also studied patients with severe pulmonary hypertension and cyanosis.

Dr. A. Rapoport (Toronto Western Hospital) is investigating the electrolyte changes in hypertensive patients on diuretic therapy.

Dr. C. R. Woolf has undertaken a study of numerous methods of investigating various aspects of pulmonary function, including gas mixing, diffusing capacity of the lung, and mechanics of breathing. He has made an extensive investigation of the relative value of various measures in the diagnosis of pulmonary emphysema and has begun a study of the objective assessment of cardiac dyspnoea.

Dermatology

Dr. A. L. Hudson (St. Michael's Hospital) has been studying nodular lesions of the lower extremities. With the co-operation of Dr. G. E. Wodehouse of the University Health Service, Dr. H. C. Hair (Toronto Western Hospital), assisted by Drs. Ruttan, Connolly, and Lester (Toronto General Hospital), has undertaken an investigation of acne and its treatment in university students. Dr. N. M. Wrong and Dr. Lester have been studying the effects of triamcinolone in the treatment of certain dermatoses such as psoriasis and atopic dermatitis. Dr. Britain Sanders is assisting Dr. Norma Ford Walker in a genetic study of neurofibromatosis.

Gastroenterology

Dr. J. C. Sinclair has continued the investigation of the epidemiology of infectious hepatitis and especially of the Elliot Lake epidemic, the largest yet recorded in Ontario. Dr. Sinclair, with Dr. A. E. Franklin and his colleagues of the Department

of Bacteriology, has made a vigorous and persistent effort by many means to identify the agents responsible for infectious hepatitis and serum jaundice.

Dr. K. J. R. Wightman and Dr. J. M. Finlay have continued the investigation of various aspects of the malabsorption syndrome; they have nearly completed the evaluation of the xylose absorption test in this syndrome and other conditions. Dr. Finlay and Dr. Spence of the Department of Surgery continue their studies of intestinal absorption following gastrectomy.

Dr. Paul O'Sullivan (St. Michael's Hospital) has nearly completed investigations of the effect of topical adrenal steroid therapy in ulcerative colitis and of the clinical value of determinations of urinary pepsinogen.

Dr. J. R. Bingham (Toronto Western Hospital) has completed a survey of results of emergency gastrectomy in cases of haemorrhage from peptic ulcer. He has almost completed an investigation of the incidence of peptic ulcer in patients suffering from chronic alcoholism.

Haematology

Dr. C. J. Bardawill (St. Michael's Hospital) has continued his investigations of a number of enzymes in the serum and white blood cells of patients suffering from leukaemia and malignant disease and certain disorders of liver and muscle. He has also measured steroid excretion in malignant and other conditions by modified and more rapid procedures than have been used heretofore. Dr. K. R. Butler (St. Michael's Hospital) is studying leucocyte antibodies in patients with various disorders.

Dr. J. H. Crookston (Toronto General Hospital) has continued his work in immunohaematology begun in England.

Dr. Wightman and Dr. O. H. Warwick continue their observations on the use of chemical and therapeutic agents in treatment of patients with leukaemias and similar conditions.

In co-operation with Drs. Axelrad, Rothfels, and Siminovitch of the Cancer Institute, Dr. E. A. McCulloch has continued studies on the phenomenon of alteration in tissue culture. He has begun an investigation of virus leukaemia, another on the effects of different dosages of whole-body radiation in mice, and a third on transplantable plasma-cell tumour X5563. He has collaborated with members of other departments in the publication of three papers on these and related subjects.

Dr. Dorothy Ley (Toronto Western Hospital) continues her investigation of iron metabolism and serum protein changes in patients suffering malignant diseases.

Dr. R. L. MacMillan has developed a modification of the thromboplastin generation test which he is using in the study of normal and abnormal clotting systems. With Dr. F. C. Monkhouse (Department of Physiology), he is working on the clearing factor activity in the serum of human subjects after administration of heparin.

Metabolism and Endocrinology

The Clinical Investigation Unit at the Toronto General Hospital, under the direction of Drs. J. C. Laidlaw and E. R. Yendt, has functioned well during the year. Good progress has been made in a number of studies, including: metabolic effects of glucagon (Dr. C. Ezrin); metabolic changes in sprue (Dr. Finlay); the influence of pregnancy and estrogen administration on adrenal cortical function and on the metabolic effects of synthetic adrenal steroids (Drs. Laidlaw and M. Cohen). With the collaboration of the Department of Obstetrics and Gynaecology, Dr. Laidlaw and his associates have shown that the rise in plasma levels of hydrocortisone during pregnancy is due not to increased secretion by the adrenal cortex but largely to a diminished ability of pregnant women to transform hydrocortisone to its metabolites and to a retention of the hormone in the plasma. This retention and the persistence of the normal diurnal variation in plasma levels probably explain the fact that Cushing's syndrome does not develop in pregnant women although their morning plasma hydrocortisone level is often as high as is found in patients with this disease.

Drs. J. C. Richardson and J. A. Dauphinee are studying the metabolism of copper in Wilson's disease. In a study of various diagnostic procedures in hyperparathyroidism, Drs. Yendt and Z. Jaworski have found that careful measurement of the serum calcium and phosphorus levels is still the best means of establishing the diagnosis. Dr. Yendt and Dr. Jaworski have also been studying various factors affecting the renal handling of phosphate and the methods used by various authors in expressing results of such studies. Their findings indicate that much of the data heretofore published on this subject is open to misinterpretation.

In his continued studies of renal hypertension by differential urine volume and sodium excretion, Dr. Yendt, with the collaboration of the urologists, has been able to make an accurate diagnosis of a causative renal vascular anomaly in an increasing number of cases. Negative results appear to be equally dependable in all patients studied to date. As a result of observations in this work, Drs. Yendt and Rapoport (Toronto Western Hospital) with Dr. Nicholson (Pathological Chemistry) have undertaken an interesting investigation of the transfer of electrolytes across the bladder wall. They have shown that under certain circumstances notable changes may occur in the concentration of electrolytes in the bladder urine.

Dr. Yendt, and also Dr. Rapoport, continue the metabolic investigation of patients with renal calculi. Dr. Yendt and Dr. Warwick have completed a survey of the incidence of hypercalcaemia and increased excretion of calcium in the urine of patients with malignant disorders.

Dr. M. W. Johnston and Dr. R. Volpé have continued their investigation of the effect of minute doses of stable iodine and of the administration of thyrotrophic hormone on the serum protein-bound iodine and uptake of radio-iodine of normal and hyperthyroid patients. They have completed a study of the effects of certain emotional and physical strains on the serum level of protein-bound iodine. Dr. H. P. Higgins (St. Michael's Hospital) has made interesting observations on the 10-minute uptake of I_{131} by the thyroid and has compared this measurement with other tests of thyroid function. He has also studied the effect of triiodothyronine and of administration of thyroid-stimulating hormone in various disorders of the thyroid. Dr. R. H. Sheppard (Toronto Western Hospital) and Dr. Paul (Obstetrics and Gynaecology) are pursuing their observations on the transfer across the placenta of radioactive thyroxin and triiodothyronine in pregnant sheep. Dr. Sheppard is studying chromatographic patterns of serum thyroxin and triiodothyronine in various clinical conditions. Dr. Rapoport and Dr. Paul are making an experimental study of foetal anoxia. In collaboration with Dr. Wm. Horsey of the Department of Surgery, Dr. Higgins has been using the radio-iodine uptake of the thyroid as a measure of completeness of hypophysectomy in patients suffering from metastatic carcinoma (breast and prostate gland).

Dr. Ezrin has studied four insulin-resistant diabetics in whose serum Dr. Peter Moloney of the Connaught Medical Research Laboratories has demonstrated antibodies which neutralize all commercial and several experimental insulins.

In all three teaching hospitals, the effect of tolbutamide and other drugs on the control of diabetes is being evaluated. Dr. W. T. W. Clarke and Dr. Murray Young completed a highly practical booklet on diabetes mellitus which will be distributed by the Connaught Medical Research Laboratories. Dr. J. A. Little (St. Michael's Hospital) has found no important difference in the effect on serum lipids between diets containing unsaturated fats and those with saturated fats. Dr. Chambers and Dr. Barbara Hazlett (Toronto General Hospital) have been studying blood flow in the feet of diabetic patients with diabetic polyneuritis, and Dr. Chambers has been making careful histological examination of the peripheral nerves of amputated legs. Dr. Hazlett continues the follow-up of juvenile and pregnant diabetics. In collaboration with Professor E. W. McHenry (School of Hygiene), she has been studying blood cholesterol in a group of diabetics. She also continues the study of absorption of B_{12} in patients with diabetes and certain types of anaemia, and the study of red cell survival using radioactive chromium.

Dr. D. A. Stinson has embarked on a long-term study of the treatment of obesity in the Out-Patient Department, Toronto General Hospital.

Working in the Department of Pathology, Dr. Ezrin has continued the study of cells of the adenohypophysis and with the aid of special stains has been able to demonstrate five different cell types. He and his associates have made the interesting finding that "delta" cells are present in greatest numbers in pituitaries of patients dying suddenly and that their number decreases rapidly with increasing duration of the final illness. Working with Dr. James Salter of the Banting and Best Department of Medical Research, Dr. Ezrin has studied the metabolic effects of glucagon used, at Dr. Salter's suggestion, on the basis of animal work, as an anti-inflammatory agent in human beings. There followed a development of ketosis, a negative nitrogen balance, and hyperglycaemia from gluconiogenesis, previously unreported in human beings. The benefits of the treatment were found not sufficient to overbalance the unfavourable side effects. Dr. Ezrin, with Dr. W. J. Horsey (Surgery) and Dr. I. Broder (Pathology), has continued the study of experimental hypothalamic lesions in monkeys, cats, and rabbits. With Dr. L. Lax (Medical Research), he has been making measurements of "transfer" rates of various isotopes in human tissues. This interesting work, based on Dr. Wrenshall's (Medical Research) experimental studies, will be continued.

Neurology

Drs. R. A. Chambers and J. C. Richardson are making a clinical-pathological study of cerebral anoxia, and Dr. Chambers is making an extensive investigation of aseptic necrosis of the spinal cord.

Dr. J. A. Walters continues his critical observations on the mechanism of pain with special reference to hysterical hyperalgesia.

Drs. John W. Scott, A. M. Park, and John Crawford are continuing work on electromyography in neuromuscular disorders.

Dr. J. Marotta (St. Michael's Hospital) is engaged in a number of clinical neurological projects.

Miscellaneous

Dr. W. B. Spaulding, with Dr. J. Dewan (Psychiatry), has made an extensive review of cases of organic psychosis, and they have written a monograph on the recognition and differential diagnosis of these conditions. In a series of eighty cases of cat scratch fever Dr. Spaulding has noticed a rather striking seasonal incidence of this disease in the fall and winter months. Working with Dr. Spaulding in the Out-Patient Department, Toronto General Hospital, Dr. M. Lenczner has demonstrated quite a high incidence of tropical parasitic disease in our immigrant population. In particular, he has collected a number of cases of cysticocercosis with multiple infarcts and necrosis of bone.

Dr. J. D. L. FitzGerald continues his studies of the immunological factors in glomerulonephritis and, with the collaboration of Dr. G. N. Ranking (urologist) and Dr. McLean (Pathology), the correlation of clinical and biopsy observations in various renal disorders; he is also working in association with Mr. S. Landi (Botany) on mould antigenicity.

Dr. J. A. Little made a survey at St. Michael's Hospital which indicated that 5 per cent of patients admitted to public medical wards were admitted for treatment of acute and chronic alcoholism, and that a still larger number suffered from conditions associated with use of excessive amounts of alcohol.

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Obstetrics and Gynaecology

Under the direction of Professor D. E. Cannell

As noted in last year's report the undergraduate teaching programme is under constant review by a Standing Committee in the Department. This year, under the leadership of Drs. C. B. Shier and J. L. Harkins, an attempt was made to determine student reaction to the teaching in this Department. The conclusions drawn from this study will be presented to the staff prior to the opening of the next academic session.

Third year teaching has been in progress at the Women's College Hospital for two years. In the coming session this will be extended to the fourth year. An experimental programme of preceptor teaching for the fourth year students will be instituted at this hospital in the coming academic session.

In the past few months the new Ontario Cancer Institute has begun to accept patients for radiotherapy. Formal opening of this unit has been arranged for the fall of 1958. It is proposed to rotate postgraduate students in Obstetrics and Gynaecology through the Institute to round out their training in the management of gynaecological malignancy.

It is hoped that the new divisions of the Toronto General Hospital will be open by mid-term of the next academic session.

The Department is pleased to report the success of Drs. T. G. Ryley and J. F. Moffat in obtaining their fellowships in the Royal College of Physicians and Surgeons of Canada.

At the end of the academic year Dr. J. D. M. Gillies vacated his post as a Research Fellow in the Department. He will continue as a voluntary assistant in the Departmental Clinics at the Toronto General Hospital.

It is with great regret that the Department records the death of Dr. L. T. Armstrong early this year. He had retired as Associate Professor and Chief of Obstetrics and Gynaecology at the Toronto Western Hospital on June 30, 1957. His untimely death deprives the Department of his kindly counsel and interest, the community of the services of a conscientious and capable physician.

The Department was honoured by visits from Dr. Magnus Haines of London, England, Mr. William Hawksworth of Oxford, England, Professor Hugh McLaren of Birmingham, England, Professor W. F. Mengert of Chicago, Illinois, Professor T. N. A. Jeffcoate of Liverpool, England, and Mr. S. Joel Cohen of Johannesburg, South Africa.

Members of the Department have continued their activities in national and international societies. They have been well represented in postgraduate teaching locally and provincially.

The Head of the Department wishes to acknowledge his gratitude for the continuing loyalty and efforts on behalf of the University of all members of the staff.

Research

Members of the staff have undertaken the following research work:

Dr. M. L. Bunker has continued his studies on the ascitic fluid in patients with ovarian carcinoma. He has completed a study on the value of Vallestril as an agent for the suppression of lactation.

Dr. J. D. M. Gillies has continued his study of Rh immunization and its relationship to difficult labour.

Dr. J. A. Harper, with Dr. J. L. Russell of the Department of Surgery, has completed and reported a clinical evaluation of urethro-vesical lysis in the treatment of urinary stress incontinence in the female.

Dr. J. A. Low's studies on the oxygen saturation of the foetus at birth have continued and been extended. The initial report of his findings is in the process of preparation. Studies of urinary stress incontinence and the determination of the chronological age of the foetus by radiography are continuing.

Dr. J. R. Norris has continued the study of all neonatal deaths and stillbirths on the Public Services of the University Hospitals. In association with Dr. D. Kumar, he has been studying the effect of premature and prolonged rupture of the membranes upon maternal and foetal morbidity. In the coming year, under his direction, further studies will be made upon the relation of uterine activity to the occurrence of premature labour.

Dr. W. M. Paul, Dominion Stores' Fellow, has completed his studies of the transfer of I_{131}-labelled thyroxin across the placenta of sheep. Studies of the biochemical changes in foetal blood and amniotic fluid during periods of uterine ischaemia were begun, using sheep as the experimental animal. This investigation will proceed in other laboratory animals and humans in the coming year. Further studies have demonstrated that isolated episodes of hypothermia produce no deleterious effects upon litter size or foetal survival in the guinea pig.

Dr. Crawford Shier's studies of the value of exfoliative cytology in prognosis of patients with carcinoma of the cervix continue and should be available for final evaluation by 1961.

Dr. D. Kumar, a graduate student, in collaboration with Dr. A. G. Gornall of the Department of Pathological Chemistry, has continued and will complete his studies this year on aldosterone excretion in normal and toxaemic pregnancies.

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Ophthalmology

Under the direction of Professor A. J. Elliot

The postgraduate training programme in ophthalmology was continued in 1957–8 and thirteen postgraduate students were registered in the Department. Dr. R. T. Collyer, London, Ontario, and Dr. W. H. R. Tanner, Vancouver, B.C., were appointed Hermant Fellows. Dr. C. B. Mortimer, Epping, England, was appointed a Fellow to work under a grant from the Defence Research Board to study "Eye Injury Related to Radiation." Dr. S. J. Vaile was appointed a Fellow to work under the National Health Grant for the study of "Ocular Diseases of Virus Aetiology." Five students completed their postgraduate studies: Dr. D. W. Harper, Toronto; Dr. R. D. Lawton, St. John's, Newfoundland; Dr. M. Neveu, Trois Rivières, Quebec; Dr. S. H. Witzel, Oshawa, Ontario, and Major J. A. Beswick, R.C.A.M.C. During this session Dr. J. S. Speakman was awarded an Alexander Piggott Wernher Memorial Fellowship at the Institute of Ophthalmology, London, England, under the direction of Sir Stewart Duke-Elder. He will return to the staff of the Toronto General Hospital and the University of Toronto to continue his research work in glaucoma.

The fellowships established by Mr. H. G. Stapells, Q.C. for clinical investigation into diseases of the eye have been awarded this year to two clinical teachers in the Department. Dr. H. R. Hausler has been working in the Banting and Best Department of Medical Research studying the aetiology of ocular diabetes. This work is now being continued under a National Health Grant. Dr. M. Shea has been a Fellow at Harvard Medical School pursuing studies in eye pathology. He will be returning to the staff of the Department at St. Michael's Hospital and the University to be in charge of the eye pathology laboratory and to continue his research into the pathogenesis of retinal detachment under a National Health Grant.

The Department was honoured by the visit of Dr. M. J. Roper-Hall, F.R.C.S., ophthalmologist to the United Birmingham Hospitals, who was a guest lecturer in the Department.

The undergraduate teaching programme continued as before with the emphasis in the third year being on bedside clinics in ophthalmoscopy. Miss Gloria B. Pierce

was awarded the J. F. Hartz Company prize for obtaining the highest mark in Ophthalmology in the third year.

In addition to lectures given within the University, members of the staff have given papers at meetings outside Toronto; Dr. J. C. Hill spoke at the American Academy of Ophthalmology and Otolaryngology in Chicago. Drs. C. McCulloch, H. L. Ormsby, P. K. Basu, J. A. Beswick, J. Dumas, and P. L. Morton gave papers at the East-Central Section Meeting of the Association for Research in Ophthalmology at Cleveland, Ohio. Dr. A. J. Elliot spoke at the American Ophthalmological Society Meeting at White Sulphur Springs, W. Va. Drs. D. Macdonald, C. McCulloch, H. L. Ormsby, G. A. Thompson, and R. D. Lawton spoke at the Canadian Ophthalmological Society Meeting in Halifax. Dr. R. G. C. Kelly gave lectures to the Medical Joint Training Centre of the Armed Forces. Dr. L. A. Lloyd lectured to the York County Medical Society, and Dr. A. L. Morgan lectured to the Royal Astronomical Society on "The Eye as an Astronomical Instrument."

An eye surgery refresher course was held in March at which the guest speakers were Dr. P. Robb McDonald, Philadelphia, and Dr. W. S. Knighton, New York. Forty doctors registered with the course from across Canada and the northern United States.

Dr. G. A. Thompson has been appointed as consultant in ophthalmology to the Ontario Cancer Institute.

The resignation of Dr. O. B. Richardson is recorded with regret from the staff of St. Michael's Hospital and the University where he was in charge of the eye pathology laboratory. Dr. Richardson is going to practise ophthalmology in Peterborough, Ontario.

Research

Members of the staff have undertaken the following research work:

The National Health Grant for "Prevention of Blindness" was continued under the direction of Dr. T. H. Hodgson. Corneoscleral tonography was further investigated by Dr. R. Keith MacDonald. To demonstrate reliability of the test, corneoscleral tonography was performed twice on the same eye in a large series of cases. The test was sometimes repeated after an interval of a few days, but usually it was repeated immediately following the first test. These repeat tests were discovered to be remarkably constant. Further testing showed that the entry time of fluorescein injected intravenously was unaffected by corneoscleral tonography. The tonometer resting on the sclera, therefore, does not cause increased formation of aqueous humour. Experimental glaucoma surgery arising out of this work is being carried out on normal rabbit eyes. From March 30, 1957, to March 30, 1958, tonographies on 271 new patients were obtained and reported to the referring clinicians. In addition, a large number of patients were rechecked approximately every six months. The methods of testing tonometers were brought up to date and twenty-seven tonometers were checked by Miss S. Hennighausen over the past year.

The National Health Grant for "Ocular Diseases of Virus Aetiology" was continued under the direction of Dr. H. L. Ormsby. Mrs. A. Fowle and Mrs. V. Simmons have been studying the problem of latent herpes simplex virus in eyes previously infected, using material removed by corneal grafting in humans, and tissues obtained from rabbits' eyes. Various methods of reactivating latent infection have been studied experimentally. Immunological studies by neutralization and complement fixation have been made in order to determine the effect of latent infection on serum antibody levels. These studies were carried out in conjunction with the Department of Bacteriology.

The National Health Grant for "Eye Bank and Corneal Transplantation" was continued. Dr. P. K. Basu, with the assistance of Mrs. D. Sawaszkiewicz and Miss I. Miller, has continued his studies on corneal grafting. These studies include the growth

of corneal epithelium on eggs, the cellular nature of immunological reactions in corneal grafts, and the fate of corneal grafts as determined by the female sex chromatin. *In vivo* storage of corneal grafts interlamellarly in rabbits' eye has been found to maintain viability and transparency of corneal grafts, and to reduce antigenicity. A new instrument for cutting lamellar grafts from full-thickness corneae has been developed. Mrs. I. Fielding has been engaged in studies on the antigenic properties of proteins in fresh and stored corneae by immunizing rabbits and determining the antibody levels by electrophoresis, and the antigen-antibody systems by gel techniques. Mrs. A. M. Wolf has completed tissue culture studies of stored rabbits' corneae to determine the effect of storage and of various solutions used in eye banks on the viability of corneal cells. In conjunction with the Canadian National Institute for the Blind she is in charge of obtaining eyes for the eye bank and of distributing them to surgeons for corneal grafting. More than seventy successful corneal grafts have been performed at the Toronto General Hospital as part of the programme conducted under the National Health Grant.

Dr. Nina Morley commenced working under a National Health Grant for "Biochemical Studies of the Cornea," in conjunction with the Department of Pathological Chemistry. She is studying the concentrations of diphosphopyridine nucleotide in fresh rabbit and beef corneae microfluorometrically.

Dr. H. R. Hausler was engaged in clinical and laboratory work on the ocular complications of diabetes. A weekly eye clinic for diabetic patients was initiated at the Toronto Western Hospital under his care. He is also heading a small research unit which was set up jointly by the Department of Ophthalmology and the Banting and Best Department of Medical Research. The work there consists of studies on the prevention and treatment of diabetic retinopathy and is intended to provide an experimental basis for a more effective clinical therapy. This research is being financed by a grant from the Department of National Health.

Under a Defence Research Board grant Dr. C. McCulloch has been directing research on the permeability of the cornea and the production of radiation cataracts.

Dr. D'Arcy Macdonald has been conducting clinical research on the use of low vision aids. He is correlating information about the various types of lenses available to assist people with very poor vision and the benefits which may be expected according to the various degrees of distance vision remaining to the patients. A paper on this subject is being presented to the Canadian Ophthalmological Society in June. He is also continuing a survey of the efficacy of retrobulbar injections of alcohol in alleviating the pain associated with absolute glaucoma. This is to determine whether the injections simply make it possible to postpone enucleation of the eye for pain for a short time, or whether they are of genuine value. He is continuing a survey on whether the examination of the buffy coat of the blood provides a reliable criterion for the diagnosis of possible malignant melanomas, especially those occurring in the eye where otherwise diagnosis must rest on the visual appearance alone.

At the Toronto General Hospital Dr. G. A. Thompson continued research into the use of radioactive phosphorus as an aid in the diagnosis of ocular tumours. A total of sixteen tests were carried out, nine by the anterior approach and seven by the posterior. Six eyes were enucleated and examined by the pathologist. All had a clinical diagnosis of a malignancy. The pathological diagnosis in five of them was malignant melanoma. Four of these eyes tested positive with the P_{32} while the fifth was a false negative. The sixth enucleated eye was thought to contain a malignant melanoma clinically. Both the pathological and the radioisotope examinations were negative for malignancy. The project is being continued.

The work of the electroretinopathy laboratory was also continued by Dr. L. A. Lloyd under a grant from the J. P. Bickell Foundation. So far sixty-five clinical electroretinograms have been done. The findings correspond with the expected results from the clinical material. With the guidance of Dr. J. W. Scott, and the technical assistance of Mr. J. Dohrman and Mrs. O. Nicholson, a reliable electroretinogram

was produced. Its clinical value is still under appraisal. Records will continue to be collected on a large number of normal patients before applying it to the study of pathological conditions. From the work to date valuable information has been given to the Department of National Defence regarding the time interval between a light source and the blink reflex.

At the Hospital for Sick Children work has continued, under the direction of Dr. A. L. Morgan, on the investigation of the cause and treatment of congenital glaucoma, with the assistance of a National Health Grant. Dr. J. S. Crawford has continued his study of the perfecting of ptosis repair and improvement of treatment of exotropia. Dr. W. P. Callahan is continuing his study of corneal diseases and corneal transplants in children.

Dr. A. J. Elliot continued his clinical research on recurrent intra-ocular haemorrhage in young adults (Eales' disease) with continuous subconjunctival therapy with hydrocortisone.

The Department acknowledges the valuable assistance of the Department of Art as Applied to Medicine and the Art Departments of Sunnybrook Hospital and St. Michael's Hospital, in the preparation of papers recording the results of this research work.

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Oto-Laryngology

Under the direction of Professor P. E. Ireland

This Department during the past year lost two members who contributed a great number of years of faithful service. Dr. D. E. S. Wishart was for many years Otolaryngologist-in-Chief at the Hospital for Sick Children. On his retirement as head of this service he was still retained as a graduate lecturer in the Department. He was one of the best known oto-laryngologists in the field of diseases of children and was honoured by various important offices in Canadian and American Societies. His father was also professor of oto-laryngology in this medical school and did much to establish it as an independent department. Dr. H. W. D. McCart, who died in January, 1958, was due for retirement this year after thirty-three years on the university staff. He had been in the Armed Services in both wars and was a most valuable clinical teacher and surgeon on the staff of the Toronto General Hospital. The Department will greatly miss these two teachers who contributed so much of their time and energy to this University.

The graduate course is continuing and has been increased from two to three years. There are twelve residents in active training in our Department, and these supply the largest proportion of oto-laryngologists which are at present trained in Canada. In the present group, one is from Spain, one from Israel, and one from Italy.

In addition to these we have had Professor G. M. Taneja from the Punjab, India. He was sent to us on the Colombo Plan for six months of special training in otology and the treatment of cancer.

Plans are being made for the utilization of Professor Joseph Farkashidy in establishing a new research laboratory. He has been working part-time on this work along with Dr. W. H. Johnson, but it is hoped that when more funds are available this work will be greatly enlarged. Dr. Farkashidy has had extensive experience in basic research and this part of the Department's function should be greatly improved.

Dr. J. A. Sullivan, formerly Assistant Professor of this Department and Oto-laryngologist-in-Chief at St. Michael's Hospital, has been appointed to the Senate of Canada and honorary surgeon to the Queen. He continues to take an interest in hearing and vestibular problems which are being investigated. Some of this work was presented at the annual meeting of the American Otological Society in San Francisco this May.

At three other meetings of the American Societies this spring on the West Coast of the United States, members of the staff presented papers: Dr. J. B. Whaley spoke at the American Laryngological Society; Dr. G. A. Henry at the American Triological Society; and Dr. Blair Fearon at the American Broncho-Esophagological Society. Three additional members of this staff will be making presentations at the Canadian Otolaryngological Society Meeting in Halifax in June.

Dr. C. W. Dobson joined the Department staff after completion of a Canadian Cancer Foundation Scholarship in head and neck cancer in New York City. He will be attached to the staff of the Toronto Western Hospital and also on the staff of the new Ontario Cancer Institute. With him at the Institute will be Dr. D. P. Bryce, of the Toronto General Hospital, who continues as chief consultant, and Dr. J. K. B. Smith as a representative of St. Michael's Hospital.

The Head of the Department has continued as a member of Council of the Canadian Otolaryngological Society, American Triological Society and the Royal College of Surgeons of Canada. He has been appointed as Chairman of the joint session of the Section of Otology and Laryngology for the combined meetings of the British Medical and Canadian Medical Associations to be held in Edinburgh next year.

Dr. G. Arnold Henry is the newly elected President of the Canadian Oto-laryngological Society and Chairman of the Programme Committee for the Edinburgh meeting as well.

We have been most fortunate in having a number of distinguished visitors this year, all of whom talked to postgraduate groups. Mr. Terence Cawthorne, from King's College and Queen's Square Hospitals in London, England, was one of the distinguished guests. He was also guest speaker at the Academy of Medicine, Toronto. Mr. Kenneth McLay, also from King's College Hospital, was here on a different occasion, and Mr. Stuart Mawson, from the Institute of Otology and Laryngology, London, England. Dr. O. E. Van Alyea of the University of Illinois was a guest during the winter, and also addressed the Academy of Medicine, Toronto.

With the aid of a grant from the Defence Research Medical Board a new laboratory has been established, for the preparation and examination of temporal bone and allied structures of the internal ear, under the direction of Professor E. A. Linell. This laboratory will be in the Department of Neuro-pathology of the University and will be a joint effort of that Department and the Department of Oto-laryngology. For many years we have been unable to have temporal bone work effectively studied from a pathological viewpoint, and we are most fortunate in having someone with the experience of Professor Linell willing to direct this work. This will be the only laboratory of its kind doing this work in Canada.

Research

Members of the staff have undertaken the following research work:

Further studies are being carried out by Drs. J. K. B. Smith and W. H. Johnson in the Vestibular Clinic at St. Michael's Hospital on the clinical assessment of the vertiginous patient. An improved method for the diagnosis of diseases of the labyrinth has been developed using a new sensitive device for the recording of eye movements in response to vestibular stimulization. It is expected that this will enable a more precise localization of vestibular lesions. Dr. W. H. Johnson and Dr. Farkashidy, who has assisted in this research, are receiving the O'Keefe Fellowship.

Dr. J. K. B. Smith has continued his investigation of the growth of nerve tissue through nerve grafts, using rats as experimental animals. In conjunction with Professor E. A. Linell of the Division of Neuropathology, Dr. Smith is also making preparations of the temporal bone of cats and monkeys on whom a utricular nerve section has been carried out. This study is directed towards finding histological proof of the effectiveness of the denervation of the utricle. Professor Linell has been awarded a Defence Research Grant to develop a pathological laboratory for preparation of sections of temporal bones. He is to be associated with the Department of Oto-Laryngology in this project.

Dr. H. O. Barber is continuing his clinical research on patients with vertigo, both at the Toronto General Hospital and at Sunnybrook Hospital, and has a special clinic for this study.

Dr. R. D. Bell has been assisting Dr. J. D. L. Fitzgerald of the Allergy Department of St. Michael's Hospital (who has been working on a National Research Council Grant) in the investigation of changes in nasal tissues in a group of nephritic patients under survey by the Allergy Department of the Toronto Western Hospital.

Dr. Page Statten has continued his research on the psychogalvanic skin-reaction audiometer in the testing of the hearing of children. Several minor research projects on hearing have been continued under the direction of Drs. J. B. Whaley and D. E. S. Wishart at the Hospital for Sick Children. The problem of hearing in children with cleft palate defects is also being studied in conjunction with the cleft palate research division at this hospital.

Publications

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WISHART, D. E. S., WHALEY, J. B. and WALLACE, W. B. "Rhinology in Children: Résumé of and Comments on the Literature for 1956" (*Laryngoscope*, vol. 67, no. 9, Sept., 1957, pp. 833–57).

Paediatrics

Under the direction of Professor A. L. Chute

As a result of a further increase in the time allotted to the teaching of paediatrics in the third year, it has been possible to give some clinical experience to these students in addition to lectures. This introduction to ward work should make it much easier for them to fit rapidly into the clinical work in their final year.

A further marked improvement in our teaching facilities was made possible through the appointment (by the Hospital) of a full-time director for the Out-Patient Department. Dr. John D. Bailey, who has taken charge of this Department, has made it possible to double the time spent by the final year students in the Out-Patient Department. One of the great problems in teaching paediatrics is to bring the student in contact with the parents as well as the patient. The present arrangements have improved the situation, but there is still room for much improvement.

One further problem of pressing importance is the very large percentage (65–70 per cent) of semi-public patients on our public wards. While much use is made of these patients for teaching, it is not a satisfactory answer for the markedly diminished number of patients who are directly under the supervision and control of the teaching group. It would appear that this situation will become even worse with the advent of the Government Hospitalization Plan. An early solution of this problem by the University, the Ontario Hospital Commission, and the hospitals seems imperative.

We are fortunate in a number of new appointments. Dr. R. R. Struthers formerly Professor of Paediatrics, at McGill University, and Associate Director of the Rockefeller Foundation's Division of Medical Education and Public Health for many years,

has become the Director of the Research Institute, the Hospital for Sick Children, and a Graduate Lecturer in the Department of Paediatrics.

Dr. Donald MacLean of Sydney, Australia, comes to us as Director of our Virus Laboratory. Dr. MacLean has had much postgraduate experience in the United Kingdom and the United States. He will also be associated with Dr. A. J. Rhodes, in the Department of Microbiology.

We would like to express our appreciation to Professor Barbara McLaren of the Department of Household Science, for granting us the opportunity to have one of her postgraduate students, Miss Yvonne Flynn, help us with some of the problems in dietetics in relation to our Metabolic Unit. We trust that this experience has been of mutual benefit and that we may look forward to its continuance in the future.

It is a pleasure to draw attention to the fact that for the second consecutive year a member of this Department has been awarded the 1957 Medal in Medicine of the Royal College of Physicians and Surgeons of Canada. The recipient this year was Dr. Richard D. Rowe, and the title of his paper was "Changes in Pulmonary Haemodynamics of New-Born Infants: A Physiological and Clinical Study."

Research

As in previous years, the research work of members of the staff of the Department of Paediatrics has been carried out in association with the Research Institute of the Hospital for Sick Children. Members of the staff have undertaken the following research work:

Dr. John Keith and Dr. Richard Rowe have published their monograph on heart disease in infancy and childhood which is a summary of many years of patient research. It is a truly comprehensive work and unexcelled in its field.

One innovation of the past year was the Poison Control Centre. This acts as both an information and a treatment centre. Data collected are proving useful in determining the major hazards from poisons in our community.

Interesting studies in the biochemical causes of convulsions have been undertaken by several staff members. Studies on the effects of certain amino acids in producing hypoglycaemia in susceptible infants have been continued. Under the direction of Dr. J. S. Prichard, an investigation has been made of B_6 pyridoxine deficiency as a cause of convulsions, using tryptophane loading as a test procedure; a study has also been made of the calcium and phosphorus levels of convulsive labile infants; and a suggestive correlation between neonatal tetany and the development of microcephaly has been found.

Dr. A. Sass-Kortsak has continued his studies into the causes of infantile and juvenile cirrhosis and liver disease. A new technique for determining small amounts of copper may help him to establish the incidence of Wilson's disease in post-mortem material.

Dr. C. P. Rance has continued his studies on the treatment of nephrosis and confirms Riley's findings in New York, that maintenance therapy with steroids, over a four-year period, leads to a 30 per cent decrease in the mortality from nephrosis in children compared with sporadic or no steroid treatment.

Dr. Robert Slater has continued his studies on the pathogenesis of kidney disease and has studied intensively some unusual cases showing marked potassium deficit. He has also continued to follow the cases of unexplained hypertension in childhood.

Dr. Donald Fraser has continued his studies in the field of calcium and phosphate metabolism, especially in relation to associated renal defects. He has improved methods for oral phosphate ingestion and absorption to offset the renal loss and facilitate skeletal calcification. He has written a review article on hypophosphatasia and another on the various types of rickets.

Dr. C. E. Snelling in collaboration with Dr. Paul Swyer has continued to measure the respiratory work of newborn infants with and without signs of respiratory distress.

In conjunction with cardiac researches it is hoped that these studies may lead to a solution of some of the very difficult problems associated with neonatal asphyxia.

Dr. J. S. Prichard, in collaboration with Dr. M. Cherniak, has found that there is an increase in glutamic oxalacetic transaminase in certain of the muscular dystrophies and in the acute phase of polymyositis. This determination would appear to help to differentiate the myopathies from the neuropathies.

Dr. H. W. Bain, in association with Dr. Wm. Donohue, has reported on a number of unusual clinical syndromes seen in the hospital, including an unusual haematological disturbance first described by Higashi and a case of pulmonary haemochromatosis.

Dr. W. A. Hawke and Dr. E. G. Murphy have continued their studies on the pathological and electromyographical changes in the muscles of children suffering from various forms of muscular dystrophy. Mr. Hugh Soltan of the Department of Zoology has also been studying the family histories of children suffering from these disorders.

Under the direction of Professor A. L. Chute, Miss Nancy Simpson of the Department of Zoology is collaborating in the study of juvenile onset diabetics and their offspring. Attempts have been made to correlate diabetes with one or other of the known blood factors, A, B, O, RH, etc., but no correlation has so far come to light. However, in association with Dr. Oliver Smithies, it has been established that these individuals do appear to have an abnormal amount of alpha-2 globulin. Further work is in progress.

Dr. S. H. Jackson has undertaken to determine and assess the importance of urinary mucoproteins in various urinary tract diseases and in patients with severe burns.

Publications

Anglin, C. S. "Aseptic Meningitis" (*Paediatric Clinics of North America*, May 1958, pp. 313–22).

Collins-Williams, C. "Allergy in Children *versus* Allergy in Adults" (*Canadian Medical Association Journal*, vol. 78, no. 4, Feb. 15, 1958, pp. 276–9).

——— "Poison Control Centres" (*Canadian Journal of Public Health*, vol. 49, no. 3, March, 1958, pp. 91–4).

Collins-Williams, C. *et al.* "Paediatric Allergy: A Critical Review" (*Annals of Allergy*, vol. 16, March-April, 1958, pp. 174–235).

Fraser, D. and Lucas, C. C. "The Identification of a Ninhydrin-positive Urinary Component recently Reported in Hypophosphatasia" (*Canadian Journal of Biochemistry and Physiology*, vol. 35, 1957, pp. 1123–33).

Fraser, D., Robertson, E. C. *et al.* "The Rising Incidence of Scurvy in Infants: A Challenge to the Physician and the Community" (*Canadian Medical Association Journal*, vol. 78, no. 3, Feb. 1, 1958, pp. 177–81).

Fraser, D. and Salter, R. B. "The Diagnosis and Management of the Various Types of Ricketts" (*Paediatric Clinics of North America*, May, 1958, pp. 417–41).

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Hawke, W. A. "Specific Reading Disabilities" (*Paediatric Clinics of North America*, May, 1958, pp. 513–22).

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——— "The Prevention of Cerebral Palsy from Convulsions in Children" (*International Record of Medicine*, vol. 171, no. 4, April, 1958, pp. 225–8).

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Rhodes, A. J. and Beale, A. J. "Aseptic Meningitis: Evidence for the Etiologic Role of Coxsackie B and 'Orphan' Viruses" (*Annals of the New York Academy of Sciences*, vol. 67, 1957, pp. 212–22).
Robertson, E. C. *The Normal Child.* Fifth ed. Winnipeg: Harlequin Books Ltd. 1958. Pp. 256.
——— *Protect His Precious Teeth.* Toronto: Canadian Dental Association. 1958. Pp. 5.
Rowe, R. D., Mitchell, S. C., Keith, J. D., Mustard, W. T. and Barnes, W. T. "Severe Valvular Pulmonary Stenosis with Normal Aortic Root" (*Canadian Medical Association Journal*, vol. 78, no. 5, March 1, 1958, pp. 311–17).
Silverthorne, N. "Antibiotic Therapy in Children" (*Ontario Medical Review*, vol. 24, no. 10, Oct., 1957, pp. 741–6, 778).
——— *Principal Infectious Diseases of Childhood.* Toronto: University of Toronto Press. 1958. Pp. 102.
Snelling, C. E. "Colic in Infancy" (*Journal-Lancet*, vol. 78, no. 2, Feb., 1958, pp. 60–3).
Wolfish, M. G. "Reading Defects in Children" (*Health*, vol. 25, no. 6, Nov.-Dec., 1957, pp. 6–7).

Pathological Chemistry

Under the direction of Professor J. A. Dauphinee

The course of instruction in pathological chemistry given to the students of the third medical year has continued as before except that, in accordance with a decision of the Faculty Council, the total number of lectures has been somewhat diminished and the subject-matter has had to be correspondingly compressed. Emphasis continues to be placed on the importance to the physician, when studying a patient, of understanding as thoroughly as possible the disturbances in biochemistry and physiology to be found in association with the various metabolic and other diseases, how they have been brought about, how they themselves may produce important signs and symptoms, how they may be recognized, and how they may best be treated. Increasing attention is being given in our course to teaching in small seminar groups in which ten or twelve students, at the close of a series of class exercises, discuss with one of their teachers in an informal fashion the significance of their findings in relation to the specific patient who is being studied.

In all, 148 students have been registered in the undergraduate course. Six students have been doing graduate work in the department and of these one is registered for the Ph.D., two have been proceeding to the M.A., and two were registered for the B.Sc.(Med).

No changes have taken place in the senior staff of the Department, but we welcome the addition of Dr. John Porter as Lecturer. Dr. Porter, a Ph.D. in Biochemistry from this university and for some time a research biochemist with Merck and Co. in Montreal, has recently been made Head of the Chemical Laboratory in the Toronto General Hospital and will help to serve, we hope, as another connecting link between the academic and the more practical aspects of our subject.

Research

The Department has continued the policy of collaborating with various members of the clinical departments in the Faculty of Medicine in the study of a number of clinical problems. These studies have been greatly helped by the facilities of the clinical investigation units which have made available to us both at the Toronto General Hospital and at Sunnybrook Hospital, and we would like to express to the staffs of both these units our sincere thanks and appreciation for their assistance.

Together with Dr. J. C. Richardson and Dr. John Humphrey of the Department of Medicine, Dr. J. A. Dauphinee and Mr. C. E. Downs have continued and expanded their studies of the abnormal copper metabolism in patients with Wilson's Disease (hepatolenticular degeneration). For some as yet unexplained reason these

patients store abnormally large amounts of copper in the brain, liver, and other tissues and this results in serious and often disabling disturbances in the functions of these organs. It is possible by the administration of BAL (British anti-Lewisite), penicillamine, and other chelating agents to increase greatly the copper excretion of these patients and to rid their bodies of some of their excess copper; and in two patients who have thus been treated a rather remarkable degree of clinical improvement has taken place. Quantitative studies have shown that weight for weight penicillamine is much more effective than BAL in the removal of copper and, as it is given orally, it would seem to be the drug of choice for continued therapy. Because of the growing recognition of the importance of other trace metals in metabolism, we are also investigating the effect of these chelating agents on the excretion of iron, zinc, manganese, and other metals which, although present in the body in only very minute amounts, undoubtedly play a very important role in many of the enzyme systems of the body.

Dr. Dauphinee and Dr. J. C. Sinclair (of the Department of Medicine) have continued their clinical and biochemical studies of patients with various diseases of the liver, or with jaundice due to liver disease or other causes. The differentiation of the cause of jaundice continues to be an important clinical problem, and a combination of a number of biochemical tests—notably determinations in the serum of (1) the various protein fractions by paper and starch gel electrophoresis, (2) the total, ester, and free cholesterol levels, and (3) the content of enzymes such as glutamic oxaloacetic transaminase, alkaline phosphatase, and the copper-containing oxidase, ceruloplasmin—have been of material help in assisting the clinician in arriving at the correct diagnosis. Together with Dr. Jean Moore of Sunnybrook Hospital, the same investigators have conducted a follow-up study of a large number of cirrhotic patients and have also investigated the effect of posture on the excretion of water and electrolytes by cirrhotic patients who also have ascites. It has been shown quite clearly that the excretion of these substances is considerably retarded when such patients are kept in an upright position and is considerably enhanced when they are maintained in a horizontal posture.

The investigations of the glutamic oxaloacetic transaminase content in the blood of patients suspected to have had a recent myocardial infarct, undertaken with Dr. C. Burton, Dr. M. Abbott, and Dr. Mitsui of the Department of Medicine, and with the assistance of Mrs. A. McGougan, have almost been completed and routine determinations have now been transferred to the Chemical Laboratory of the Toronto General Hospital. The presence of an elevated amount of this enzyme in the blood has been shown to be of considerable value in helping to diagnose the occurrence of a recent cardiac infarction.

Dr. Velta Cernavskis has adapted the starch gel electrophoresis method of Smithies to the study of the haemoglobins present in the blood of patients with various kinds of anaemia and with other haematological disorders.

Dr. T. A. Wright has been awarded the B.Sc.(Med.) for his thesis on "The antihaemophilic globulin, fibrinogen, platelets and prothrombin of blood during extracorporeal circulation" (in collaboration with Dr. W. T. Mustard and Dr. Sanford Jackson of the Hospital for Sick Children).

Dr. Anne Patzauer has completed her thesis on the relation of antidiuretic hormone and aldosterone to the formation of ascites in patients with cirrhosis and has been awarded the M.A. degree by the School of Graduate Studies for this work.

Mr. L. A. W. Feltham has continued his investigations of the factors which control the electrolyte content of muscle and has studied experimentally the effect of the administration of various doses of natural and of artificial mineralo-corticoids on the sodium and potassium content of rat muscle. Along with Dr. Kumar (of the Department of Obstetrics and Gynaecology) and Dr. A. G. Gornall, he has also extended his investigations to the study of human muscle biopsy material in cases of normal and of toxaemic pregnancy and in other patients where a disturbance in electrolyte metabolism is known to have occurred.

Reported by Professor T. F. Nicholson

Dr. T. F. Nicholson has continued work on the localization of functions in the renal tubule. It has been shown that the excretion of phosphate is accomplished by glomerular filtration followed by reabsorption in the first third of the proximal tubule and active excretion by the distal tubule, rather than by simple filtration and reabsorption as has been previously believed. It has also been shown that the increase in phosphate excretion caused by parathyroid extract is due to stimulation of excretion and not to inhibition of reabsorption.

In collaboration with Drs. Rapoport and Yendt of the Department of Medicine, it has been shown that under certain circumstances sufficient sodium may be reabsorbed from the urinary bladder to invalidate conclusions as to the renal excretion of sodium which are based on analyses of bladder urine.

Reported by Professor A. G. Gornall

Mr. B. Eglitis has completed a thorough study of factors influencing the reliability of the chemical estimation of adrenalin and noradrenalin. The method is being applied to a study of mental patients showing signs of adrenergic stimulation.

In the Steroid Hormone Laboratory the microchemical determination of aldosterone in urine has occupied a major portion of the time of Miss R. Nakashima, Mrs. M. L. Schonbaum, and Mrs. M. Kandel. The excretion of this hormone has been studied in patients with essential and renal hypertension, in normal pregnant, pre-eclamptic, and adrenalectomized pregnant women, and in a variety of clinical disorders of electrolyte metabolism.

Our study of the biological effects of aldosterone has been extended with the assistance of Mrs. C. J. Koladich and Miss B. Felzmann. There appears to be some evidence in female rats of a resistance to the hypertensive effects of aldosterone. In ovariectomized animals, estradiol in small doses has prevented the development of hypertension when aldosterone is administered.

In collaboration with Dr. W. G. Bigelow the presence of a protective factor against hypothermia in the brown fat of groundhogs has been investigated.

In the Clinical Investigation Laboratory Mrs. H. Pavuls and Mrs. V. Reinholds have continued to carry out determinations of hormones and nitrogenous and ketone substances excreted by patients with various diseases.

The following problems have been under study during the year by Dr. J. A. Dauphinee and Dr. A. G. Gornall in collaboration with the clinical departments: steroid and metabolic studies in gout and arthritis, with Drs. M. MacLachlan, J. Digby, and M. A. Ogryzlo, Department of Medicine; hormonal and metabolic studies in periodic catatonia, with Dr. J. Lovett Doust and associates, Psychiatry; aldosterone excretion in hypertensive patients, with Dr. R. J. Slater, Paediatrics, and Dr. E. R. Yendt, Medicine; metabolic effects of glucagon, with Dr. C. Ezrin, Medicine; aldosterone excretion in pregnancy and pre-eclampsia, with Dr. D. Kumar, Obstetrics and Gynaecology; factors influencing the metabolism and excretion of aldosterone, with Dr. J. C. Laidlaw, Medicine.

The substantial assistance provided by grants from the Medical Division of the National Research Council, the Ontario Heart Foundation, the Department of Public Health, and the Ciba Co. Ltd., is very gratefully acknowledged.

Reported by Professor William Paul

In the final year of support by the Atkinson Charitable Foundation the biophysical laboratory has been fully utilized by members of clinical departments. Drs. M. W. Johnston, R. Volpe, R. H. Sheppard, H. P. Higgins, Joan Vale, and others, with the assistance of Dr. I. Broder, have used the laboratory for their clinical applications of radioactive iodine, both as sodium iodide and in various organic forms. Dr. B. Hazlett has continued haematological studies with radioactive chromium and

radiocyanocobalamin. Dr. J. M. Finlay is continuing with the use of radioactive triolein and oleic acid in his studies of fat absorption.

In collaboration with Dr. Broder of the Department of Medicine, Miss Amy Britton has devised paper chromatography methods for the determination of radioactive iodinated compounds in blood. Investigations of the turnover rate of radioactive thyroxin in patients are now in progress.

With the active co-operation of the staff in Neurosurgery about one hundred patients were studied using radioactive arsenic for the external localization of brain tumours. Radio phosphorus studies were continued for eye tumours by Dr. Thompson and for brain tumours by Dr. T. P. Morley.

Three oximeters are maintained in the Cardiovascular and Cardiopulmonary Units of the Toronto General Hospital as an aid in cardiac investigations under the direction of Dr. R. W. Gunton and C. R. Woolf. An investigation into some of the electrical properties of photovoltaic cells was undertaken, beginning with the design and construction of special apparatus.

Publications

Gornall, A. G. "Symposium on the Clinical Significance of Aldosterone: II, Effects of Aldosterone and Some Clinical Applications" (*Canadian Medical Association Journal*, vol. 77, no. 8, Oct. 15, 1957, pp. 773–87).

Gornall, A. G., Eglitis, B. and Stokes, A. B. "Endocrine Studies and Hormonal Effects in Periodic Catatonia"; in *Psychoendocrinology*, ed. M. Reiss, pp. 152–7. New York: Grune and Stratton. 1958.

Kalant, H. "Chromogenic and Fluorogenic Reactions of Adrenocortical and Other Steroids in Concentrated Acids" (*Biochemical Journal*, vol. 69, no. 1, May, 1958, pp. 79–93).

——— "Fluorimetric Measurement of Adrenocortical Steroids in Concentrated Acid Solution" (*ibid.*, pp. 93–8).

——— "A Microdialysis Procedure for Extraction and Isolation of Corticosteroids from Peripheral Blood Plasma" (*ibid.*, pp. 99–103).

Klebanoff, S. J. "The Effect of X-Radiation on the Glutathione Metabolism of Intact Erythrocytes *in vitro*" (*Journal of General Physiology*, vol. 41, no. 4, March 20, 1958, pp. 725–36).

——— "The Relation of Hydrogen Peroxide to the Inhibition of the Glyoxalase Activity of Intact Erythrocites by X-Radiation" (*ibid.*, pp. 737–53).

Nicholson, T. F. "A Comparison of the Effects of Proximal and Distal Tubular Damage on the Action of Desoxycorticosterone and Aldosterone" (*Canadian Journal of Biochemistry and Physiology*, vol. 35, no. 8, Aug., 1957, pp. 641–44).

——— "The Site of Acidification of the Urine in the Dog's Kidney" (*ibid.*, vol. 35, no. 6, June, 1957, pp. 419–23).

Pathology

Under the direction of Professor J. D. Hamilton

During the past year several major changes have been made in the teaching programme of this Department.

In the second medical year the formal course in pathology was completed in one academic session. This meant that the total number of lectures was reduced by twenty, and a reduction in the number of gross demonstrations by seven, but with an increase in the number of microscopic sections examined. This change in programme was instituted in order that in the third medical year group teaching might be continued for two hours per week throughout the year. The advantages of teaching in small groups has been emphasized in previous reports. It is hoped that the continued association with pathology during a year which is devoted so intensively to clinical medicine will be of benefit to the students. The present third medical year has not had the benefit of the group teaching programme as they had to complete the formal course begun before the change was instituted. The first year in which group teaching

will have its trial will be in the coming academic session. I should point out that students of the second medical year did not like the altered programme, in that they felt it was too concentrated. It is hoped that with some rearrangement in the coming year a better organization of the course from the students' standpoint will result.

For the first time a didactic course in general and special pathology of 110 hours was given to third year dental students. This course was designed so that students spent two three-hour periods per week in the Department. The six-hour period that the dental students spent in the Department was divided as follows: two hours formal lectures, one hour gross demonstration and discussion, two hours microscopic sections. Each group of fifteen students was assigned to an instructor with the rank of Assistant Professor or higher. The instructor remained with the students during the laboratory classes, and took the students to the Museum for the gross demonstration and discussion sessions. Halfway through the course groups changed instructors. Judging by the results of the term and final examinations, the method of instruction appeared to be successful. The students appeared interested throughout the course.

Dr. J. D. Hamilton has been invited to lecture at the Universities of Paris, Lille, Lyon, and Strasbourg under the auspices of the French Government.

The first G. Lyman Duff Memorial Lecture at McGill University was given by Dr. Hamilton in October, 1957.

The graduate and undergraduate teaching programme, apart from the changes mentioned above, has continued as in the past, with the addition of three seminars in pathology to graduate students in the Department of Physiological Hygiene.

Dr. W. Anderson and his staff in surgical pathology have continued to give conferences to the various specialists within the hospital. Dr. Anderson again gave the course to graduate students in pathology on Friday evenings, with an increase in the total number of lectures from twenty-four to thirty. This course continues to be very popular, and there is a demand for a further increase in the number of lectures.

Dr. Donald Thompson has been giving a course in gynaecological pathology on alternate Tuesday evenings to the resident and interne staffs from the departments of gynaecology of the various teaching hospitals. An atlas of gynaecological pathology is being prepared to assist with the teaching of this subject.

Research

Drs. John Augustine and G. F. Buckley have continued to assist Dr. J. D. Hamilton with the investigation of arteriosclerosis of coronary arteries and of peripheral vessels.

Dr. H. Z. Movat has made considerable progress in the short time since he has joined this Department in his investigations of the structure of the normal glomerulus, and the changes occurring in acute glomerulonephritis. Dr. Movat has developed very satisfactory techniques for examining ultra-thin sections of tissue by light miscroscopy and at the same time has been able to examine comparable sections with the electron miscroscope. His work is proceeding with the co-operation of Dr. McLean and his associates at the Western Hospital who are supplying renal biopsies.

Dr. Ritchie MacKay has continued to assist with the investigation of pneumoconiosis in the Department of Physiological Hygiene.

Dr. Hamilton has collaborated with Dr. J. W. Corkill of the Connaught Laboratories in a study of the pathological effects of staphylococcal toxin.

Dr. R. C. Ritchie has been continuing his researches into tumours of the maskinonge.

Dr. R. G. S. Malone is engaged on a study of reactions to injury of foetal rats.

Dr. Augustine, together with Dr. C. Gray, is reporting an unusual case of cystic fibrosis of the pancreas.

Dr. Buckley, with Dr. R. C. Ross, has been continuing research into the action of carcinogens on the respiratory epithelium of rats. This research has been supported by the National Cancer Institute.

Dr. C. Ezrin and Dr. Heidi Swanson have been continuing studies on the cells of the pituitary gland.

Dr. R. G. Hines has been making a study of tissue changes in CO_2 narcosis.

Dr. H. J. Barrie has been continuing studies of the kidney and together with Dr. A. Macrae has been making an analysis of the relationship between malignant hypertension and occlusion of one renal artery.

The research activities of Dr. W. Anderson and his staff have again been considerable. In collaboration with the Department of Surgery a study of malignant cells in the venous drainage from tumours before, during, and immediately following surgery has been undertaken in the Cytology Laboratory. In this same laboratory a study is being conducted on the natural history of abnormal cervical cytology in pregnancy. With the co-operation of the Department of Gynaecology biopsies are being obtained from a considerable number of such patients, in addition to the routine smears.

A re-evaluation of the series of cases of carcinoma of the body of the uterus, reported some years ago, has been begun.

Dr. Anderson has continued his studies of bone and joint disease with the assistance of Dr. Robert Moore, who is studying the clinical aspects of degenerative joint disease. With the assistance of a grant from the National Research Council, investigations of metabolic bone disease are continuing with emphasis on establishing the normal range of histologic patterns.

Division of Neuropathology

Dr. E. A. Linell, Professor Emeritus, has undertaken an experimental research on the pathology of the internal ear and associated structures for the Defence Research Board of Canada.

Dr. Sheila Birse is investigating berry aneurysms with special reference to the aetiology of the widespread cerebral softenings which frequently follow their rupture.

Dr. R. A. Chambers has been appointed Research Associate in the Division of Neuropathology. He has received a grant from the Multiple Sclerosis Society of Canada to study the demyelinating diseases.

Dr. Peter Lampert has delivered papers on Syringomyelia and Parkinsonism before the staff in Pathology.

In collaboration with Dr. T. P. Morley and Dr. W. D. Rider, Dr. Mary I. Tom presented a case of acute radiation necrosis of the brain before the combined Pathology and Neurology and Psychiatry sections of the Academy of Medicine.

Publications

Anderson, W. "Giant Cell Tumor of Bone" (*American Journal of the Medical Sciences*, vol. 234, no. 3, Sept., 1957, pp. 334–41).

Barrie, H. J. and Urback, P. G. "The Cellular Changes in Myocardial Infarction" (*Canadian Medical Association Journal*, vol. 77, no. 2, July 15, 1957, pp. 100–6).

Donohue, W. L. and Bain, H. W. "Chédiak-Higashi Syndrome—A Lethal Familial Disease with Anomalous Inclusions in the Leukocytes and Constitutional Stigmata: Report of a Case with Necropsy" (*Pediatrics*, vol. 20, no. 3, Sept., 1957, pp. 416–30).

Gunson, H. H. and Donohue, W. L. "Multiple Examples of the Blood Genotype C^wD-/C^wD- in a Canadian Family" (*Vox Sanguinis, Basel*, vol. 2, no. 5, Nov., 1957, pp. 320–31).

——— "The Blood Genotype C^wD-/C^wD-: Preliminary Report" (Proceedings of the 6th Congress of the International Society of Blood Transfusion, Boston, Mass., Sept. 3–5, 1956) (*Bibliotheca Haematologica, Basel*, fasc. 7, separatum, 1958, pp. 123–6).

Hamilton, J. D. "Tissue Lesions in Hypersensitivity" (The First Lyman Duff Memorial Lecture) (*Canadian Medical Association Journal*, vol. 78, no. 11, June 1, 1958, pp. 834–9).

Hamilton, J. D., Sepp, A., Brown, T. C. and Macdonald, F. W. "Morphological Changes in Smokers' Lungs" (*Canadian Medical Association Journal*, vol. 77, no. 3, Aug. 1, 1957, pp. 177–82).

Watt, H. J. and Barrie, H. J. "Long-standing Thrombosis of the Pulmonary Arteries Complicating Valvulotomy for Mitral Stenosis" (*Journal of Thoracic Surgery*, vol. 34, no. 6, Dec., 1957, pp. 804–9).

Pharmacology

Under the direction of Professor H. Cullumbine

The teaching programme in pharmacology has remained the same as for the past year. The major courses were given to the second and fourth medical years, the second dental year, the fourth year in pharmacy, and to graduate students registered in this and other departments. This year, for the first time, the instruction in the compounding and dispensing of drugs was given in the Faculty of Pharmacy by members of that Faculty. We are again grateful to the Laboratory of the Attorney-General of the Province of Ontario for the provision of laboratory facilities for the graduate course in toxicology and to the guest lecturers Professor L. J. Rogers, Dr. C. G. Farmilo, Dr. F. M. R. Bulmer, Dr. C. S. Hanes, Mr. M. G. Allmark, and Mr. H. A. Belyea, who assisted with that course.

There has been a large increase this year in the number of graduate students working in the Department. Many more have had to be refused facilities and there is no doubt that a large number of students wish to follow a career in research. Lack of laboratory accommodation and of senior staff is the limiting factor in accepting more graduate students in this Department.

The programme of encouraging a limited number of medical students to do research in the Department during the summer proved a success last year and, thanks to the generosity of several pharmaceutical firms, a similar number of students will again work with the staff this summer.

Research

Reported by Professor H. Cullumbine

Members of the staff have undertaken the following research work:

Professor H. Cullumbine has commenced a study of the effect of morphine and 5-hydroxytryptamine on the release of acetylcholine from cholinergic nerves. In collaboration with Mr. D. H. McCurdy the quantitative response of various cholinergic receptors to several substrates has been determined and a new theory of the behaviour of these receptors has been proposed. With Mr. R. Aston the mode of action of five chemically dissimilar ataractic drugs has been investigated and a classification of these drugs according to their mechanism of action has been suggested. Dr. J. B. Fotheringham is continuing this work. Mr. P. C. Dandiya has continued his studies of the pharmacological actions of extracts of *Acorus calamus* L. and a highly purified principle may have therapeutic possibilities. With the co-operation of Mr. T. S. Konop, a semi-quantitative test, using the cat which responds to narcotic analgesics by showing excitation, has been devised to indicate addiction-potency liability following the use of such narcotics in man. Dr. A. C. Beaton has studied the mechanism by which the anaesthetic, Fluothane, produces hypotension. With the co-operation of Dr. J. W. Reingwertz, a small experimental unit to study pulmonary function has been established. Dr. J. B. Murphy is studying the production of homogenous aerosols and the variation of their inhalation toxicity with particle size. With Mr. H. Salem the toxicities of various possible atmospheric pollutants, sulphur oxides, aldehydes, smoke, etc., have been determined.

Professor G. H. W. Lucas, with Mr. M. Grossman, has continued an investigation of chromatographic methods for the separation of alkaloids from biological material. The isolation of solanine and solanidine from the various portions of the potato plant has been undertaken at the request of the Department of National Health and Welfare, Food and Drug Division. With Mr. G. Johnson considerable progress has been made in developing suitable methods to determine tranquillizers in biological material. With Dr. C. Korczak a complete study of the crystal forms of the various tranquillizers with many reagents has been fruitful. These crystal forms

will aid in the detection of such drugs as they are recovered in biological material.

Professor W. Kalow has continued his studies on the atypical form of human serum cholinesterase. Investigations were conducted in co-operation with the mental hospitals in Toronto and with the Division of Laboratories, Ontario Department of Health. It was found that the occurrence of this enzyme tends to be associated with mental illness, particularly with different forms of psychoneurosis and paranoia. The action of this enzyme, its susceptibility to inhibition, and its electrophoretic mobility were studied with Mr. R. O. Davies. In collaboration with Dr. A. Marton, methods for the demonstration and electrophoretic separation of aromatic esterase of human serum have been worked out. An enhancing influence of hydrocortisone on the action of local anaesthetics has been suggested by preliminary studies. Some observations made during toxicity studies on tranquillizing phenothiazin derivatives have been followed by systematic investigations in collaboration with Dr. I. C. Radde. Using radioactive iodine, a suppressing influence of Nozinan, one of these derivatives, on thyroid function in rats was found. Clinically effective vapour concentrations of the general anaesthetic, Fluothane, have been measured in collaboration with Dr. I. MacKay of the Department of Anaesthesia.

Graduate students have completed the following theses:

For the Ph.D. degree:

Aston, R. The action of some depressant drugs on the central nervous system.
Davies, R. O. Studies on usual and atypical pseudocholinesterases in the serum of man.
McCurdy, D. H. A study of the cholinergic receptors in the guinea pig ileum and frog's rectus abdominis muscle.

Publications

Cullumbine, H. "Cholinergic Blocking Drugs"; in *Pharmacology in Medicine*, by Victor A. Drill, pp. 408–18. New York: McGraw-Hill. 1958.
——— "The Toxicity of Screening Smokes" (*Journal of the Royal Army Medical Corps*, vol. 104, 1957, p. 119).
Cullumbine, H. and Paterson, G. R. "Teaching Pharmacology to Pharmacy Students in a Faculty of Medicine" (*Bulletin, Canadian Conference on Pharmaceutical Faculties*, vol. 10, 1957, pp. 216–20).
Kalow, W. "Spectrophotometric Determination of Fluothane Vapour" (*Canadian Anaesthetists' Society Journal*, vol. 4, 1957, pp. 384–7).
Kalow, W. and Genest, W. "A Method for the Detection of Atypical Forms of Human Serum Cholinesterase: Determination of Dibucaine Numbers" (*Canadian Journal of Biochemistry and Physiology*, vol. 35, 1957, pp. 339–46).
Kalow, W. and Gunn, D. R. "The Relation between Dose of Succinylcholine and Duration of Apnea in Man" (*Journal of Pharmacology and Experimental Therapeutics*, vol. 120, 1957, pp. 203–14).
Kalow, W. and Staron, N. "On Distribution and Inheritance of Atypical Forms of Human Serum Cholinesterase, as Indicated by Dibucaine Numbers" (*Canadian Journal of Biochemistry and Physiology*, vol. 35, 1957, pp. 1305–20).
Martin, E. J. "Interpretation of Variability of Radon in Repeated Breath Samples" (*American Medical Association Archives of Industrial Health*, vol. 15, June, 1957, pp. 506–9).
——— "Steady and Unsteady States of Breath Radon in Subjects with Chronic Radium Poisoning" (*Journal of Applied Physiology*, vol. 10, no. 3, May, 1957, pp. 447–50).
Martin, E. J. and Kover, G. R. "Indirect Effects of Psychogenic Factors on the Elimination of Radon in the Breath" (*American Medical Association Archives of Industrial Health*, vol. 16, July, 1957, pp. 14–16).
Maykut, M. O. "The Combined Action of Pentobarbital and Meperidine, and of Procaine and Meperidine, in Guinea Pigs" (*Canadian Anaesthetists' Society Journal*, vol. 5, no. 2, April, 1958, pp. 161–9).
——— "Studies on Degeneration of Myelin Sheaths of Nerves Caused by Long-acting Local Anaesthetics Injected Subcutaneously into Guinea Pigs" (*Canadian Journal of Biochemistry and Physiology*, vol. 36, 1958, pp. 511–16).

Physiology

Under the direction of Professor Charles H. Best

The teaching schedule has been augmented by a lecture and laboratory course for pharmacy students, conducted by Dr. O. Sirek. The laboratory rooms are now fully occupied for five days each week during the academic year.

During the Session 1957–8 eight visiting scientists presented papers at the Physiological Society.

The lectures given by the Head of the Department are listed in the report of the Department of Medical Research. Professor R. E. Haist gave a lecture, by invitation, on "Factors Influencing the Endocrine Pancreas," to Section V of the Royal Society of Canada at Edmonton, and he gave the presidential address at the Annual Meeting of the Canadian Physiological Society in Ottawa. Professor F. C. Monkhouse gave two lectures at Queen's University, Kingston, on "Blood Clotting in Theory and Practice" to the first year medical students, and on "'Studies on Heparin-Induced Clearing Factor" to internes and staff members of the University Hospital, Kingston. Professor J. W. Scott gave an address on "EEG Changes during Hypothermia" to the British EEG Society in London.

Research

Members of the staff have undertaken the following research work:

In Professor R. E. Haist's section, Dr. M. A. Ashworth has investigated the effect of the continuous intravenous infusion of fructose on the islets of Langerhans and, with Dr. Rosemary D. Hawkins, the influence of this procedure on the glucose-6-phosphatase activity of liver and kidney. With Dr. Hawkins he has further studied the effects of continuous glucose infusion on the level of activity of this enzyme in animals pretreated intensively with insulin. Dr. Hawkins and Mr. H. Schachter found that the continuous infusion of glucose into alloxan-diabetic rats led to no significant change in the glucose-6-phosphatase activity of liver, whereas in animals not receiving alloxan a definite depression in activity was obtained. With Dr. E. Schönbaum and Mr. Schachter, Dr. Hawkins has investigated the effects of glucose infusion, ACTH infusion, and shock secondary to limb clamping on the glucose-6-phosphatase activity of liver and the steroid output of the adrenal gland, and has done preliminary work on the effect of insulin on the glucose uptake by adrenal slices. With Miss G. V. Kovacs she is observing the action of continuous infusion of sodium fluoroacetate on the islets of Langerhans, and diabetes production. Dr. Hawkins, Dr. Ashworth, Mrs. R. Moscarello and Mr. T. Friedlich are investigating the influence of environment on the metabolic changes following injury. Mr. R. Kajioka, Mrs. Moscarello and Mrs. C. J. Baines have followed the effects of potassium infusion in shocked and non-shocked rats. Mr. S. Wong is studying the effects of extracts of certain native plants on experimental diabetes.

Professor J. Markowitz, in collaboration with members of the staff of the Ontario Veterinary College, has advanced several problems in experimental surgery.

In Professor James Campbell's section research on diabetes was continued. Dr. P. Riet Correa, Professor of Physiology and Director of the Institute of Experimental Physiology of the University of Rio Grande do Sul, Brazil, and the recipient of a travelling fellowship from the Rockefeller Foundation, has made a study of the insulin activities of the blood of normal, prediabetic, and diabetic animals. With Dr. G. A. Wrenshall, and ably assisted by Mrs. M. A. Riet Correa, he has studied the formation of insulin by slices of the pancreas *in vitro*, and the passage of insulin from the pancreatic tissue into the medium. Dr. Campbell, Dr. G. F. Wilgram, and Dr. Jean M. Patterson, with the co-operation of Dr. Lena Lewis of the Cleveland Clinic Foundation, have compared the modes of transport of fats in the blood during absorption of fat from the intestine, with mobilization of fat from body depots to the sites of utilization. Dr. Kunigunda Zymantiene has studied the effects of intra-arterial

infusion of serum from diabetic dogs on the secretion of insulin, the effects of lymph duct cannulation on diabetes, and the flow of bile in prediabetic dogs. Mr. H. Socol found that in the liver tissue of diabetic animals the amount of co-enzyme A and the activity of the condensing enzyme are reduced. Mr. G. R. Green and Mr. Socol found that an increase in the co-enzyme A of the liver tissue is a response of rats exposed to low environmental temperature. Mr. Green is studying the factors that influence the production of citrate by tissues.

In Professor A. M. Rappaport's section, Dr. J. W. Martyn continued the study of the effect of hepatic or systemic arterial autoperfusion on dogs subjected to irreversible haemorrhagic shock. There was an increase in central venous pressure, in carotid flow, a decrease in hepatic arteriovenous oxygen difference, and a normal myocardial function as indicated by the electrocardiogram. Toxic hepatitis was induced in rats by intraperitoneal injection of bromobenzene. The pathology was studied by *in vivo* transillumination of the liver and by routine histological methods. Rats continuously infused via the portal system with glucose and vitamins C and P showed a greater resistance to damage. The increase in their transaminase level was significantly lower when compared with similarly intoxicated controls perfused with saline only. Applying the acinar concept to the study of the histopathology of the liver, Dr. Rappaport has prepared a critical review of the pertinent literature.

In Professor F. C. Monkhouse's section, Dr. Monkhouse has continued studies on plasma antithrombin. Antithrombin levels in rats and rabbits were decreased following the intravenous injection of thrombin, and the decrease was proportional to the amount of thrombin injected. The injection of thromboplastin did not give consistent results. With Dr. O. Sirek and Dr. Anna Sirek, plasma prothrombin levels have been measured in dogs receiving oral hypoglycaemic compounds. Mrs. Ruth MacKneson has studied the production of clearing factor under a variety of conditions and in several animal species. With Dr. R. L. MacMillan, Department of Medicine, studies are being carried out on normal and atherosclerotic subjects. Miss Gunta Bambers has studied the relationship of histamine and heparin to mast cells. This work has been carried out in co-operation with Dr. W. G. B. Casselman.

In Professor D. W. Clarke's section, Dr. N. F. Forbath has been studying the effects of various enzyme poisons upon pentose transport in the isolated rat diaphragm. This work is being done in connection with a study of the actions of an oral hypoglycaemic agent, DBI. Experiments with a similar agent, carbutamide, have shown that under certain circumstances it can cause an increase in the amount of glycogen in the diaphragm. This is consistent with the hypothesis that the agent acts by stimulating insulin release by the pancreas. Mr. R. L. Evans has completed a series of experiments on the relationship between ethyl alcohol metabolism and carbohydrate metabolism, as studied in excised portions of liver, diaphragm and brain in alcohol-fed and control animals. Mr. J. E. Harris has been working on a comparison of the amounts of extractable glucagon from pancreases of diabetic and of non-diabetic patients. Preliminary studies suggest that in the former there is a reduced amount of extractable glucagon.

In Professor J. W. Scott's section, Mr. J. Blumenstein has continued his study of the histochemistry of the muscular dystrophy produced by feeding rabbits a choline-free diet. Mr. V. H. Chrom assayed the acetylcholine in the choline-deficient animals, and Mrs. J. M. Shephard undertook some electroencephalographic studies of the animals on the choline-free regimen. Mr. R. G. Black has continued the development and testing of equipment for determining strength-duration curves of muscles. Dr. H. J. Hoffman recorded simultaneous pressure changes in the urinary bladder and renal pelvis of normal and paraplegic dogs. Dr. S. Yamada and Dr. S. L. Vandewater (Department of Anaesthesia) undertook a study of hypotensive drugs at lowered body temperatures. The electroencephalographic study of dogs during hepatic coma, with Dr. Rappaport, was completed. In conjunction with Fl./Lt. H. P. Brent, R.C.A.F., a study was made of the cerebral effects of reduced blood sugar, hyperventilation, and positive acceleration.

In Professor O. Sirek's section, Dr. Sirek has continued the investigation of the cause of oedema observed in offspring of alloxan-diabetic rabbits. A normal serum electrolyte concentration having been found in litters of diabetic mothers, attention has now been focused on serum proteins and glycoproteins. In collaboration with Dr. Anna Sirek of the Banting and Best Department of Medical Research, a series of liver function tests in sera of dogs receiving tolbutamide has been performed.

Graduate students have completed the following theses:

For the M.A. degree:

BAMBERS, Miss G. The relationship of heparin to histamine in tissues under normal and experimental conditions.

BARROW, Mrs. P. C. Environmental and hormonal influences on the development of vascular lesions in the rat and rabbit.

KAJIOKA, R. Studies related to experimental shock concerned especially with elevations in blood potassium levels and carbohydrate changes.

For the Ph.D. degree:

ASHWORTH, M. A. Dietary and other factors influencing the islets of Langerhans.

RADDE, Miss I. C. Studies on thyroid function and on thyroid hormone metabolism.

PUBLICATIONS

BEST, C. H. and TAYLOR, N. B. *The Living Body: A Text in Human Physiology.* Fourth ed. New York: Henry Holt. 1958. Pp. 756.

CHAIKOF, L. and CAMPBELL, J. "Decreased Insulin Requirement following Growth Hormone Administration in Diabetic Dogs" (*Endocrinology*, vol. 61, Dec., 1957, pp. 618–26).

KALANT, O. J. "The Effects of Testosterone Propionate, ACTH and Cortisone Acetate on the Succinoxidase Activity of the Adrenal Gland of the Rat" (*Endocrinology*, vol. 62, March, 1958, pp. 237–44).

KALANT, O. J. and SELLERS, E. A. "The Effects of Sex Hormones on the Succinoxidase Activity of the Adrenal Gland of the Rat" (*Endocrinology*, vol. 61, Sept., 1957, pp. 264–70).

MONKHOUSE, F. C. "Studies on Antithrombin and Heparin Cofactor" (*Thrombosis et Diathesis Haemorrhagica*, vol. 1, 1957, p. 8).

MONKHOUSE, F. C. and CLARKE, D. W. "Further Studies on the Purification of Antithrombin and Heparin Cofactor" (*Canadian Journal of Biochemistry and Physiology*, vol. 35, June, 1957, pp. 373–82).

MONKHOUSE, F. C., MACKNESON, R. and BAMBERS, G. "Extractable Heparin Level in Rat Tissues under Normal and Experimental Conditions" (*Proceedings of the Society for Experimental Biology and Medicine*, vol. 95, July, 1957, pp. 489–92).

NAJAR, L. and RAPPAPORT, A. M. "A Double Yoke Harness for Prolonged Immobilization of Small Animals" (*Proceedings of the Society for Experimental Biology and Medicine*, vol. 95, May, 1957, pp. 65–6).

RAPPAPORT, A. M. "The Structural and Functional Acinar Unit of the Liver—Some Histopathological Considerations"; in *Hepatitis Frontiers*, pp. 3–17. Boston: Little, Brown & Co. 1957.

RAPPAPORT, A. M. and HIRAKI, G. Y. "The Anatomical Pattern of Lesions in the Liver" (*Acta Anatomica*, vol. 32, 1958, pp. 126–40).

——— "Histopathologic Changes in the Structural and Functional Unit of the Human Liver" (*ibid.*, pp. 240–55).

RAPPAPORT, A. M., RIDOUT, J. H., BEST, C. H. *et al.* "Microcirculatory Changes in the Liver of Choline-deficient Rats" (*Proceedings of the Society for Experimental Biology and Medicine*, vol. 97, March, 1958, pp. 522–4).

SELLERS, E. A. and SCHÖNBAUM, E. "Enhancement of Goitrogenic Action of Propylthiouracil by Thyroxin" (*Science*, vol. 126, Dec., 1957, pp. 1342–3).

Psychiatry

Under the direction of Professor A. B. Stokes

The statement that no study can flourish regardless of the public's attitude towards it, even if true only in part, raises some special issues for psychiatry.

No one may doubt, reasonably, that human living wherever located, is vulnerable, and that adaptive distress common to all emerges as a pathological disablement in many. Accidents, infections, bodily ailments of various kinds are not modern phenomena but have been suffered through the ages as part of man's relation to his world. Public attitudes, historically considered, have often hindered those devoted studies which, by now, have yielded knowledge sufficient for a considerable control of illness. Despite the hindrances the outcome has been the general acceptance of medical services and the demand for their provision as a right of "freedom from disease."

Studies of mental disorders, perhaps even more than those of bodily ills, have endured public fears, ignorances and rejections. But, despite some residual stigmatization, mental health services very evidently and potently bring hardly gained knowledge to the relief of the emotionally disturbed and mentally ill. As with physical ailments treatment facilities are now demanded as of right.

One form which the demand takes is for more *trained* psychiatrists and psychiatric personnel: it is to this challenge that the university department directs its greatest efforts. But in doing so the worries of providing *education* as well as *training* arise. How can psychiatry be fostered as a developing body of knowledge? Who, away from vociferous public demands for treatment services, is exploring, testing, thinking, trying out new ideas from which newer, more economical, and more effective treatments will emerge in the future? How can the psychiatrists of tomorrow be encouraged beyond the expedient techniques of today? It is a matter for curious reflection that whereas the hindrances to the development of psychiatry in the past were those of disclaim now they include demand.

In short, the university department must assert, continually, that its function is that of fostering and developing psychiatry as a body of knowledge; this primary educational role includes but is greater than that of training. Its resources of personnel, finances, and buildings must effect an organization where *doing* is represented by exemplary service and *thinking* by the best of teaching and research.

The number of graduate physicians enrolled with the Department for specialist education in psychiatry has increased to a total of fifty-one. Of these, twenty were successful, after two years of study, in the 1958 diploma examination. Of the diplomates of past years, eighteen were successful in the certification examinations of the Royal College: two members were elected by examination to the Fellowship of the Royal College.

This large number of young psychiatrists, while receiving instruction in the University, have made a notable contribution to the psychiatric services of Metropolitan Toronto. The network of clinical facilities associated with the university programme of teaching and research in psychiatry include: the In-patient Service, the Out-patient Service, Day Care Centre and Forensic Clinic of the Toronto Psychiatric Hospital; In-patient and Out-patient Services of the Ontario Hospital, Toronto; the Psychiatric Divisions of Sunnybrook, Wellesley, St. Michael's, and the Western Hospitals; the Division of Psychological Medicine of the Hospital for Sick Children; Out-patient Service, Thistletown Hospital; Toronto Mental Health Clinic; Family and Children Court Service; Brookside Hospital and Clinic (Alcoholism Research Foundation). In all these clinical centres instruction and supervision are carried out by qualified clinical teachers in association with strong centralized courses at the Toronto Psychiatric Hospital.

It is to be noted that all the facilities of the Toronto Psychiatric Hospital (the central university teaching hospital in psychiatry) are housed in temporary structures and that at some future time this circumstance will create a considerable problem. The new psychiatric institute, which has been under prolonged consideration for the past seven years, is the hoped-for answer.

Over the academic year 1957–8 the Department has continued to develop extramural courses of instruction. Extension courses in Rorschach techniques, per-

sonality typology, mental pathology, and psychiatric social work have had notable success.

Instruction to nurses, psychologists, social workers, occupational therapists, and other groups has continued. A number of distinguished visitors from other centres have lectured in the Department.

The undergraduate classes in psychiatry have been reorganized, following a study by a committee under the chairmanship of Dr. W. E. Boothroyd. It has been possible to improve the undergraduate exposure in a personal clinical setting to the problems of emotional disability. This reorganization will continue over the next year.

The standard of the 1958 graduating class was good in psychiatry. In 1959 it is proposed to hold a clinical and oral examination in addition to the written papers.

The support of the R. Samuel McLaughlin Foundation, the McLean Foundation, the Bursary Committee of the Medical Alumni Association, and many private donors is gratefully acknowledged. Without this support the policy of sending the best students to other world centres would be impossible.

The Dominion-Provincial Mental Health Grants and Bursaries, while still administratively cumbersome, continue to allow very worthwhile local developments. The Minister of Health of the Province of Ontario and his staff have maintained the warmest association in collaborative endeavour.

The Postgraduate Division of the Medical Faculty, the Medical Faculty Council, and the Academic Council of the Department have provided wise criticism and helpful support. The stimulus of new ideas, novel suggestions and provocative thinking has been always present within the framework of departmental colleagueship.

Research

The research efforts of the Department of Psychiatry continue in the genetic, physical, psychological, and social areas. While in each area there are pointed questionings in respect to delimited problems, there is also a continuous review of the meaning of the particular findings to the general concern for a fuller, more penetrating understanding of mental disorder. A Committee on Research has been established under Dr. Lovett Doust to fulfil this integrative review function.

Dr. D. A. Sprott, biometrician in the Department, has developed the application of multivariant analysis to psychiatric problems. Analysis of the results of physiological observations on psychiatric patients has hitherto been confined to two reference terms. This procedure has been unsatisfactory because it assumes arbitrarily the absence of concomitant variables (and hence ignores the implications of homeostasis) and, at the same time, does less than justice to the data available. Now it has been shown that the newer methods of multivariant analysis yield more meaningful information in the ongoing kinetic researches. In this very important work Dr. Sprott has been associated with Dr. D. Naidoo, a visiting research fellow from London, England.

Dr. M. Sloane has progressed in his anatomical studies of the archipallium. This work has reference to an uncovering of feeling tone relationships in the cerebral integrate; it has been temporarily slowed down by defects in laboratory facilities.

Current interest in 5-hydroxytryptamine (Serotonin) in mediating neural transmission and in promoting metabolic exchange in nerve cells has stimulated Dr. H. Husdan to investigate the possible ways in which the function of this metabolite may be deranged in patients with mental illness. This study is being undertaken in the research laboratories of the Ontario Hospital, Toronto. Dr. J. B. Fotheringham is pursuing a parallel study involving the new psychopharmaceuticals under the direction of Professor Cullumbine in the Department of Pharmacology.

The kinetic metabolic investigation of patients with the psychoses of myxoedema and with unremitting catatonic stupor has been done with the object of ascertaining the possible hormonal and biochemical relationships between these conditions and periodic catatonia. The effect of progesterone in circular insanity (alternating hypo-

mania depression) has been studied. The effect of tri-iodo-thyronine in patients with certain types of hallucinosis has been investigated. Patients with menstrual psychoses are being studied. In all these biochemical and hormonal investigations, collaboration with Dr. A. G. Gornall and the Department of Pathological Chemistry has been crucial.

Physiological studies under Dr. Lovett Doust have continued fruitfully. The autonomic responses of representative groups of psychiatric patients are being investigated by Dr. Charles Gregory in the research laboratories of the Ontario Hospital, Toronto (Dr. J. N. Hagan, Medical Superintendent, and Dr. A. Miller, Clinical Director). The relationship of perceiving to emotional upset and the disturbance of the relationship in different psychiatric illnesses are the ultimate objective of these researches. The influence of affect on homeostasis as revealed by autonomic oscillation is under review.

The part played by capillary anoxaemia in influencing the metabolism of the tissue cells of the skin continues to be of great interest. Water partition studies, varying osmosis, and plethysmographic observations of the changing hydration and dehydration of cells are continuing. The studies are concerned with man's relationship to changing environmental conditions and to his subjective feeling tone. Correlations between the findings and simultaneous molecular oxygen availability and capillary blood lactate are being sought.

The role of erythrocytic aggregation (sludging) in the capillary circulatory disturbances seen in psychiatric patients is being investigated in association with Dr. S. Bensley of the Department of Anatomy.

The electroencephalographic studies of patients with periodic catatonia, under Dr. A. Bonkalo, are continuing. Physiological tests of outcome, when electroconvulsive therapy is prescribed, are continuing under Dr. A. L. Jones.

Psychological researches continue. In particular, Dr. S. Neiger is comparing the Rorschach protocols of certain groups of psychiatric patients with those of normal subjects in various occupations. This work aims to make the Rorschach test a better instrument in both normal and abnormal psychology by (*a*) extending its application to the relatively unexplored field of the personality psychology of occupations, and (*b*) increasing its discrimination value between psychiatric diagnostic groups as compared with each other and with normal subjects. Dr. B. Quarrington and Mr. Owen White have completed their study of substitutive learning in alcoholics, neurotics, and psychotics. Dr. Quarrington and Mr. E. Douglass continue their enquiry into disturbances of speech development.

Problems of psychodynamics and psychopathology are being investigated. Dr. D. Cappon, in association with Dr. C. Ezrin of the Department of Medicine, has looked at the psychological difficulties associated with hermaphrodites. With Dr. D. Coates, Dr. Cappon has studied the body image of the blind with the connotation of the effects of sensory deprivation on personality integration. Dr. A. Parkin has investigated the emergence of schizophrenic reactions from neurotic reactions over short periods of time.

Social areas of research are represented by Dr. T. Mallinson's continuing investigation of small group interplays, Mr. F. Toombs's enquiries into communication systems, and Mr. J. Seeley's studies with the Ontario Alcohol Foundation.

Clinical researches have been very active. Dr. D. Lewis (St. Michael's Hospital) has used lysergic acid Diethylamide as an aid to psychotherapy in the general hospital practice of psychiatry. With Dr. Bonkalo he has studied the clinical value of a new phenothiazine type of tranquillizing drug. Dr. D. J. McCulloch, with his associates at the Out-Patient Clinic of the Ontario Hospital, Toronto, has instituted a large-scale research into the effects of psychotherapy. Changes occurring in patients receiving psychotherapy will be related to a large number of variables derived from a life history questionnaire and from psychological test protocols. Dr. W. Mitchell has been appraising the value of progesterone in the puerperal psychoses. Dr. J. D. Armstrong

has been testing new treatment techniques in the field of alcoholism and Dr. W. B. Spaulding has studied the onset of the dementing processes. A number of active enquiries have been initiated in the forensic clinic: (*a*) to isolate and identify those personality traits which distinguish certain classes of sex offenders, neurotics, and psychotics from other forensic patients; (*b*) to develop test indices for assessing the degree and type of personality disorder in forensic cases; and (*c*) to provide material for theory development in this difficult area of clinical practice. Dr. H. C. Hutchison and his associates are pioneers in a forgotten field of human disability.

As may be seen the over-all picture is one of creditable activity in first-hand experiencing and testing. What may be proven as true remains for future judgment.

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Radiology

Under the direction of Professor A. C. Singleton

The teaching of radiology has been similar to that of previous years, both at the undergraduate and postgraduate levels. The number of postgraduate students in the course leading to the Diploma in Medical Radiology is increasing, ten candidates having tried the Diploma examinations this year. Of the ten, eight were successful.

Dr. D. T. Burke has resigned as Associate Professor and Director of the Department of Radiology, Sunnybrook Hospital, and has been succeeded by Dr. K. E. Hodge. The staff of the Department remains otherwise unchanged.

The clinics in diagnostic radiology to the final year undergraduate students continue to be well attended and it is felt that, after five years' experience, this has been a valuable addition to the teaching of clinical radiology at the undergraduate level.

The new Ontario Cancer Institute, under the directorship of Professor C. L. Ash, has recently been opened and it is anticipated that the work in radiation therapy and in clinical and fundamental cancer research will show a large increase in the coming year.

Research

Members of the staff have undertaken the following research work:

Dr. J. D. Munn is investigating the cause and incidence of pneumoperitoneum in the newborn. He and Dr. C. A. F. Moes are conducting research into the correlation of clinical, radiological, and surgical findings in pyloric stenosis and neurenteric cysts. Dr. Munn anticipates that this year will conclude the study in the incidence of pneumothorax in hyaline membrane disease in infants.

Dr. K. E. Hodge, with Dr. G. A. Lawson and Dr. C. M. Godfrey of the Department of Physical Medicine, Sunnybrook Hospital, is conducting investigations in spinal traction for the treatment of painful back and neck conditions. Dr. Hodge is working on techniques for the improved demonstration of the small bowel by orally administered air and non-flocculating barium.

Dr. M. R. Hall, in conjunction with Dr. E. R. Yendt and Dr. W. K. Kerr, is making a study of renal hypertension.

Dr. D. E. Sanders, with Dr. N. Delarue of the Department of Surgery, is investigating the use of mediastinal and pulmonary angiographic findings in bronchogenic carcinoma in assessing resectability. With Dr. J. M. Low, of the Department of Obstetrics and Gynaecology, Dr. Sanders is continuing research on stress incontinence.

Dr. L. R. Harnick and Dr. B. C. Prior have been conducting research in an attempt to assess relative bone density in radiographs in the study of osteoporosis.

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Surgery

Under the direction of Professor F. G. Kergin

During the year there has been no fundamental change in undergraduate teaching, but the Surgeons-in-Chief of the four hospitals concerned have worked together to co-ordinate teaching more closely so that all students will have equal opportunity and experience, and duplication will be avoided. Similarly, the members of the special divisions of surgery in these hospitals have co-operated to outline a teaching plan for each specialty and to assure uniform coverage of the required topics. This co-operation among the hospitals is of special importance in the third year when each student spends one term under instruction in each of the hospitals.

The members of the Department have continued to do their share of teaching in the established postgraduate courses, and in addition an important new course has been undertaken. The first annual postgraduate course in fractures and trauma was given from March 10 to 15. It was organized by the Orthopaedic Division of the Toronto General Hospital, and orthopaedic surgeons from the other teaching hospitals, as well as members of the other surgical specialties, participated in the teaching. Much of the material used in this course and to be obtained for future courses becomes available through the generosity of Mr. E. P. Taylor who made a gift of money to the University to be used by the Orthopaedic Division of the Toronto General Hospital for a Fracture Follow-up Clinic.

Among a number of distinguished visitors during the year we have particularly enjoyed visits from John Bruce, Regius Professor of Clinical Surgery at Edinburgh University, and Sir Walter Mercer, Professor Emeritus of Orthopaedic Surgery at the same University. Professor Bruce delivered the Balfour Lecture on October 30, his subject being "Strategy and Tactics in the Surgical Management of Peptic Ulceration," and Sir Walter lectured to the senior students and residents on "Painful Conditions of the Shoulder."

Dr. F. I. Lewis retires from the position of Associate Professor at the end of this year to become a Graduate Lecturer and to continue in private practice. Dr. Lewis became Head of the First Division of General Surgery at the Toronto General Hospital in 1948 on the death of Dr. Roscoe Graham and has enhanced the reputation of that division as a great teaching service. In addition he has been unsparing in his devotion to the welfare of the Department in the hospital and has given generously of his time on many important committees.

As an indication of the extraordinary development in the field of cardiovascular surgery both the Toronto General Hospital and the Toronto Western Hospital are establishing Cardiovascular Surgical Services. At the Toronto General Hospital Dr. W. G. Bigelow will be in charge of the service and associated with him will be Dr. J. A. Key and Dr. R. O. Heimbecker. Dr. D. R. Wilson accepted an invitation to take over direction of the new service at the Toronto Western Hospital. Dr. Wilson has been a most valued and popular member of the staff of the Toronto General Hospital and brings to his new appointment great technical skill and mature judgment in this newest of surgical specialties.

Professor Emeritus Robert Janes has brought honour to himself and to the University by his appointment as a Sims Commonwealth Travelling Professor of Surgery for 1958 and spent more than three months, in the early part of the year, visiting Commonwealth medical schools in Africa. He is peculiarly fitted for this interesting but arduous assignment by his broad background as a general surgeon and his flair for teaching.

During the year 1956–7 Dr. W. R. N. Lindsay, supported by a Fellowship granted by the Workmen's Compensation Board of Ontario, and under the direction of Dr. F. P. Dewar, studied the late results of fractures of the os calcis. The thesis prepared as a result of this study was submitted to the American Association for the

Surgery of Trauma and received the Annual Award of that Association for the most valuable contribution on a subject related to trauma.

The following members of the Department have been promoted from Associate to Assistant Professor: Dr. I. B. Macdonald, Dr. D. L. MacIntosh, Dr. H. R. C. Norman, and Dr. S. A. Thomson. The following have been promoted from Clinical Teacher to Associate: Dr H. H. Campbell, Dr. S. R. Lowrey, Dr. T. P. Morley, Dr. C. J. Robson, and Dr. H. V. Slemon. Dr. John Hall has been appointed to the Orthopaedic Service of the Hospital for Sick Children.

Research

Members of the staff have undertaken the following research work:

Cardiovascular Surgery

Dr. W. G. Bigelow, with the assistance of Dr. A. S. Trimble who has been supported by a Defence Research Board fellowship, has continued the study of hibernation, and in the past year has been successful in extracting a substance from the hibernating gland of the ground hog which, when administered to ordinary laboratory animals, greatly increases their tolerance for cooling. In this work they have had the assistance of Dr. A. G. Gornall, Dr. E. Schönbaum, Mrs. Grajman, and Mrs. C. Mookerjea. Under Dr. Bigelow's direction Dr. R. H. Wensel, in co-operation with Dr. R. L. MacMillan of the Department of Medicine, has studied the problem of bleeding during hypothermia. The administration of heparin during the cooling phase has proved effective in preventing this complication.

Dr. R. O. Heimbecker, with the assistance of Dr. P. J. F. Kuyper, who has been supported by a National Research Council grant, has studied a number of problems related to cardiovascular surgery. With the help of Dr. H. B. Fairley, of the Department of Anaesthesia, they have tested and modified in the laboratory various types of pump-oxygenator and have adapted them for clinical use. An electronic device has been developed which automatically adjusts pumping rates in relationship to the patient's venous pressure. Dr. Barrie of the Department of Pathology has evolved a technique for demonstrating minimal air embolism and control studies have been done with experimental air embolism for comparison with the results of perfusion by bubble-oxygenators. Experiments with transplanted cardiac valves are being continued.

Dr. J. A. Key, with the assistance of Dr. R. H. Wensel, has continued a long-term study of the fate of a variety of types of arterial prostheses and this study is now almost complete. Attempts have been made, in the experimental animal, to produce revascularization of the myocardium by tapping the left ventricle, to date without success. In collaboration with Dr. S. D. Gordon and Dr. E. M. Tanz of the Plastic Surgery Service, sections of the aorta have been replaced experimentally by dermis grafts.

Dr. W. T. Mustard with Dr. W. Sapirstein has evolved a method for carrying out cardiac by-pass using an experimental animal's own lungs as the oxygenator instead of an artificial oxygenator and this work was reported at the Forum Section of the meeting of the American Association for Thoracic Surgery in April, 1958. With Dr. T. A. Wright, Dr. Mustard has studied the effects of extracorporeal circulation on blood components and has demonstrated that the antihaemophilic globulin is depleted directly in proportion to the length of time that an artificial heart lung machine is used. They have also demonstrated the presence of a precursor to prothrombin.

General Surgery

Dr. D. J. Currie is investigating the factors which can cause acute cholecystitis in the experimental animal.

Dr. N. C. Delarue has completed a final evaluation of the results in a large series of patients treated by adrenalectomy for advanced mammary cancer and has a report in preparation. Under his direction Dr. D. C. Steele has carried on the continuing study of the cases of bronchogenic carcinoma admitted to the Toronto General Hospital by surveying the records for the past five years. Under a grant from the Ontario Cancer Treatment and Research Foundation, and with the help of Dr. D. E. Sanders of the Department of Radiology, Drs. Delarue and Steele have investigated the place of pulmonary angiography in assessing the extent of bronchogenic carcinoma and its operability; they have also, in co-operation with Dr. W. S. Anderson of the Department of Pathology, initiated a study of cancer cells in the blood under various conditions.

Dr. G. H. C. Joynt continues his efforts to cause pulmonary emphysema in the experimental animal by implanting a one-way valve in a bronchus.

Dr. L. J. Mahoney is attempting to prepare an antigen from cancers of the stomach which may influence the course of this disease in human patients.

Dr. J. D. Mills is continuing the follow-up study of over nine hundred patients who have been treated by partial gastrectomy for a variety of conditions at Sunnybrook Hospital.

Dr. H. F. Robertson continues his long-term follow-up of patients with peripheral vascular disease and is investigating these patients by various methods including plethysmography.

Dr. W. J. E. Spence, in association with Dr. J. M. Finlay of the Department of Medicine, using radioactive fat has studied fat digestion and absorption in a variety of gastro-intestinal diseases and after various kinds of gastric resection.

Dr. N. A. Watters is co-operating with Dr. T. C. Brown of the Department of Pathology of the Ontario Cancer Institute in a study of circulating cancer cells at various stages of treatment of the primary lesion.

Neurosurgery

Dr. W. J. Horsey has continued, with Dr. C. Ezrin of the Department of Medicine, an experimental investigation of hypothalamo-hypophyseal relationships and they have demonstrated the presence of a mechanism in the hypothalamus which inhibits the secretion of the thyrotropic hormone.

Dr. W. M. Lougheed has developed a technique for producing in the experimental animal a subarachnoid haemorrhage without damage to brain or cerebral blood vessels, and is proceeding to a study of the effects of this type of lesion.

Dr. T. P. Morley is continuing and extending his studies of cerebral tumours grown in tissue culture.

Dr. J. W. Scott has directed Dr. H. H. Hoffman in experiments designed to elucidate the cause of hydro-ureter in paraplegic patients. They have made simultaneous pressure recordings in the urinary bladder and renal pelvis in both normal and paraplegic dogs and have studied urinary secretion against elevated ureteral pressure. In association with Dr. S. L. Vandewater of the Department of Anaesthesia, Dr. W. M. Lougheed and Dr. S. Yamada, the inter-relationship of hypothermia and hypotensive drugs in modifying blood pressure has been studied.

Orthopaedic Surgery

Dr. F. P. Dewar has continued his interest in fractures of the os calcis and with the Wallace and Mary Duncan Fellow, Dr. G. D. Kay, has made an experimental study of the forces required to fracture the human os calcis.

With the assistance of Dr. I. A. Todd, Dr. W. R. Harris has continued his studies of experimental fat embolism using quartz rod microscopy and is developing a method of estimating fat levels in the blood by paper chromatography. They have also investigated the nutrition of epiphyseal plates in an effort to develop a method of increasing limb growth.

Dr. D. L. MacIntosh has continued a clinical study of patients treated by hemiarthroplasty of the knee, using a plastic prosthesis.

Dr. Ian Macnab has studied 250 patients who have had fractures of the tibia with a view to relating rate of healing of the fractures to observations made on the experimental animal on the importance of blood supply in fracture healing. He is also investigating the factors which affect the bridging of a bone defect with special reference to the effects of infection and the lytic action of pus on bone chips.

Dr. G. F. Pennal is investigating experimental fractures of the radius and ulna as well as completing a clinical study of fracture-dislocation of the pelvis and central dislocation of the hip.

Dr. R. B. Salter is conducting a clinical study of fractures about the elbow in children.

Dr. E. H. Simmons, collaborating with Dr. J. F. Murray, is investigating the experimental use of dermis grafts for arthroplasty.

Plastic Surgery

Dr. S. D. Gordon is investigating the effect of polyethylene on the healing of tendons and the reaction of the peritendinous tissues to the plastic.

Dr. W. K. Lindsay continues his clinical studies in the end results of peripheral nerve injuries in children, tumours of the jaw, malignant soft tissue tumours in children, and factors influencing the end result of treatment of cleft palate. With Dr. H. G. Thomson he has made an extensive experimental study of factors influencing restoration of function in lesions of the digital flexor tendons.

Urology

Dr. W. K. Kerr, assisted by Dr. A. Keresteci who has been supported by a grant from the Ontario Cancer Treatment and Research Foundation, has conducted several investigations. With Miss Helen Mayoh they have investigated the distribution of zinc in the human prostate gland. With the help of Dr. G. L. Dale of the staff of the Toronto Hospital for Tuberculosis, they have studied the blood electrolyte changes in patients treated by ileocystoplasty for tuberculous vesical contracture. Investigations are being conducted to develop a more precise method of determination of blood acid phosphatase. A method for producing local renal hypothermia during operations on the kidney has been developed with the help of Dr. C. A. Smythe.

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Therapeutics

Under the direction of Professor K. J. R. Wightman

The teaching of therapeutics is a matter of ever increasing difficulty since the number of agents available continues to grow, and more diseases are becoming amenable to some kind of treatment, be it curative or palliative. While it is manifestly impossible to cover all these things in detail, it is important to indicate as far as possible the directions in which progress is being made and the principles which are involved. Above all it is necessary to emphasize the personal aspect of the relations between patients and physician and the factors which must be kept in mind apart from the purely scientific aspects of treatment. Thus the subject becomes something more than an extension of pharmacology.

The theatre clinics appear to be the most useful part of the course in the third year, and the seminars conducted by the Assistants in Therapeutics in the fourth year are also appreciated by the students. The Assistants this year were Dr. C. D. Anderson, Dr. J. R. Evans, and Dr. D. Watt.

Joint conferences conducted by the Departments of Medicine, Pharmacology, and Therapeutics at the Hospital have also been arranged in the fourth year, to good effect.

Research

Members of the staff have undertaken the following research work:

Dr. J. R. Hilliard has carried out a study of the use of Megimide and Daptazole in severe barbiturate poisoning, as well as of the other measures of importance in this condition. He has also made a retrospective study of patients who have undergone splenectomy. Investigations of thrombocytosis and leukaemia have continued. A new antibiotic (Kanamycin) is under study. An increasing number of requests are being made by the pharmaceutical companies for clinical trials of new compounds. At times these can be fitted into existing research programmes, but so far no very well-organized method of dealing with the problem has been possible within the Department of Therapeutics.

Physical and Occupational Therapy

Under the direction of Dr. A. T. Jousse

During the past year the teaching staff have continued to carry a heavy load of teaching. Fortunately, the necessity of lending occasional aid to the teaching programme at the University of Montreal no longer exists.

The secretarial staff have assumed more responsibility and work as the result of the policy of decentralization, whereby the examinations are held under the auspices of the division and not, as formerly, under the direction of the Registrar. All staff members, in whatever category, have given loyal and dedicated service.

Miss Moira M. Craig returned to her home in Newcastle-on-Tyne, England, after completing a year of teaching in a Canadian school.

Two candidates completed the postgraduate course of training, which will qualify them for teaching physical therapy. One of these teachers, Miss Lois Haslam, will be taken on staff in the capacity of Demonstrator, and next year will devote her full time to teaching undergraduate students.

In July, 1957, Miss L. Pollard and the Director of the course attended the meeting of the International Society for the Welfare of Cripples, in Church House, Westminster, London, England. The Director presented a paper on "The Management of Spasticity in Paraplegia."

Miss K. McMurrich has contributed a book to the literature on functional anatomy and its relation to occupational therapy. The book was long in preparation, and embodies concepts acquired from many years of teaching experience. The book, which was published by the University of Toronto Press, offers the double advantage of contributing useful concepts in a short text.

Miss Ruth Bradshaw was elected President of the Canadian Physiotherapy Association on the occasion of the last annual meeting held in Montreal.

Once again the undergraduates held Open House during February. This year two nights were set aside for the event and a very large attendance resulted.

In May, 1958, fifty-nine young women graduated in Physical and Occupational Therapy. Of this number, three passed with honours.

Publications

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Banting and Best Department of Medical Research

Reported by Professor Charles H. Best

Members of the staff have undertaken the following research work:

Professor C. C. Lucas and Dr. G. F. Wilgram have been working under the general direction of Professor Best to determine whether choline deficiency in primates leads to liver damage analogous to that seen in rats. Fatty livers have been produced in Cebus and Rhesus monkeys by diets free from choline. The unexpected distribution of the fat (periportal, rather than centrilobular as in the rat) has led to further investigation of the influence of dietary protein on the distribution of hepatic lipids in the rat. Dr. Sailen Mookerjea and Dr. Lucas have been examining the effect of dietary choline and of vitamin B_{12} on the synthesis of cholesterol in rapidly growing young rats. Dr. Lucas and Dr. Jessie H. Ridout have continued their studies on the effects of different dietary fats and of other factors on the concentrations of cholesterol in the blood serum. No significant difference was observed between the effects of vegetable oils and those of animal fats, whether the diet contained cholesterol or not. Dr. Lucas, Dr. Jean M. Patterson, and Dr. Ridout have made further studies of the extractability of phospholipids. Contrary to common impressions, large proportions (20 to 90 per cent) of tissue phospholipids are extractable by acetone. This soluble portion, which has often been lost (by discarding the acetone used in preliminary dehydration of tissues), may contain compounds of exceptional metabolic interest. Mr. R. J. Gillespie and Dr. Lucas have continued their studies of the role of alcohol in causing damage to the liver. The effects of different concentrations of ethanol upon the mucosa of the stomach and duodenum of rats are currently being evaluated.

In Dr. Best's section Professor J. M. Salter and Mr. I. W. F. Davidson have continued to investigate the metabolic actions of glucagon. It has been shown for the first time that glucagon injections raise the metabolic rate of rats by 35 to 45 per cent within an hour. Additional studies have revealed that this calorigenic action of glucagon is dependent upon the presence of the thyroid gland and the adrenal cortex but not of the adrenal medulla. The increase in oxygen consumption is partly due to an increase in the metabolic activity of the liver. Earlier investigation showed that glucagon greatly increases amino acid catabolism, and recent studies reveal that it reduces the net synthesis of fat and produces ketosis in experimental animals. Attempts to learn more about the fundamental cause of these changes in fat and protein metabolism are in progress. Dr. Salter and Dr. R. de Meyer have studied the effect of glucagon and insulin on the growth of Walker carcinosarcomas transplanted to

rats. When the tumour-bearing rats are treated with either insulin or glucagon, the growth of the malignancy is slightly retarded. When the afflicted animals are treated simultaneously with both hormones, growth of the tumour is either greatly inhibited or completely stopped. Cessation of treatment is followed by a resumption in the growth of the tumour. Attempts are being made to augment the carcinostatic action of glucagon-insulin therapy and to elucidate the factors responsible for this phenomenon. Dr. S. K. Mukherjee and Dr. Salter have continued investigation of the metabolic changes induced in hypophysectomized rats following administration of growth hormone. Dr. D. S. M. Haines has undertaken a study of the aetiology of hyperlipaemia that develops in experimental animals subjected daily to a sub-acute haemorrhage.

Dr. B. Rosenfeld and Miss Jessie M. Lang have extended their studies on liver lipids in several directions. Their new method of measuring "free" and "bound" liver lipids has been successfully applied to a study of the influence of dietary protein, apart from that of choline, on these two types of liver lipids in the rat. In dogs with experimental impairment of hepatic circulation, they have been able to measure quantitatively an increase in the "free" liver lipids which conventional analytical procedures do not reveal.

Dr. Anna Sirek, in collaboration with Professor F. C. Monkhouse and Drs. O. Sirek and J. Logothetopoulos, studied the effect of the oral hypoglycaemic agent tolbutamide on depancreatized and normal dogs. The first change noticed at various dose levels was usually an elevation of the serum alkaline phosphatase concentration which was followed by a fall in serum albumin and an elevation in the serum glutamic-oxalacetic transaminase and glutamic-pyruvic transaminase levels. Histological studies of the autopsied animals showed in some cases characteristic changes in the Kupffer cells of the liver. In collaboration with Dr. B. Leibel, liver function tests have recently been performed in a series of human diabetics receiving tolbutamide and no pathological changes have been found.

In Professor Erich Baer's Sub-department of Synthetic Chemistry the synthesis of naturally occurring phosphatides and the study of their structures have been continued. Dr. D. Buchnea succeeded in obtaining L-α-(dioleoyl) cephalin, the first unsaturated synthetic α-cephalin of known structure and configuration. It was found to possess practically the same activity in blood coagulation as the lipoid component of thrombokinase. Further work accomplished by Dr. Buchnea comprises the synthesis of: (1) bis-(L-α-glyceryl) phosphoric acid, (2) unsaturated α-phosphatidic acids and α-bisphosphatidic acids, and (3) saturated and unsaturated L-α-phosphatidyl L-α-glycerols, both structurally related to phosphatides recently isolated from the alga Scenedesmus. The unsaturated phosphatidyl glycerol is a fairly satisfactory substitute for cardiolipin in VDRL tests. Dr. V. Mahadevan has continued his syntheses of α-lecithins with two identical short-chain fatty acid substituents, and has now obtained those containing hexanoic-, octanoic-decanoic acids. The L-α-(bis-hexanoyl) lecithin, highly soluble in water, was found, as expected, to be an excellent substrate in enzyme research, yielding smooth activity *vs.* time curves. Dr. A. Duke is working on the synthesis of lecithins containing propylene glycol instead of glycerol, as there is some indication that phosphatides of this type may occur in brain. Dr. R. J. Stedman is studying methods for the synthesis of phosphatides containing hydroxy amino acids, with special emphasis on hydroxyproline. Mr. T. Visser succeeded in establishing experimental conditions for the synthesis of vinyl phosphoric acid that permit its isolation as pyridinium or lithium salts, both with a satisfactory degree of purity. Mr. H. H. Flehmig has capably assisted the members of the sub-department in their research work.

Professor W. G. B. Casselman and Dr. Lucas have completed their investigations on the sequence of changes in the structure and chemical composition of the livers of rats fed low protein, hypolipotropic diets during the development of cirrhosis and the subsequent feeding of diets supplemented with additional protein, one of the lipotropic factors, or certain combinations of these. Dr. B. Lombardi has continued his

studies on the early histogenesis of cirrhosis and the factors influencing it. In this Department and in the Department of Anatomy, Dr. Casselman and Dr. K. F. A. Ross have been studying normal and dystrophic muscle by interference microscopy and histochemistry.

Dr. Logothetopoulos has been investigating the comparative histochemistry of the islets of the pancreas under conditions of experimentally induced hyperfunction and hypofunction. He has used intravital metal-chelating reactions as a means of producing selective necrosis of tissues containing a large concentration of zinc in the prostate of the rat, the submaxillary gland of the rabbit, and the Paneth cells of the small intestine in both species. Observations have been made on the cytological localization of the mechanism of elimination of trace metals. The histological effects of prolonged treatment with glucagon are being studied in collaboration with Dr. Salter, and with Drs. O. and A. Sirek the cytotoxic effects of prolonged administration of hypoglycaemic sulfonamides.

In Professor G. A. Wrenshall's section, Dr. G. Hetenyi is using tracer methods to measure the effects of insulin on the glucose space and on rates of glucose transfer into and out of the plasma compartment in depancreatized and adrenalectomized-depancreatized dogs. He is also taking part in a critical study of the effectiveness of available tracer methods for rate determinations in living systems. Dr. L. C. Lax is initiating a tracer study of the effects of thyroid activity on rates of phosphorus transfer throughout the rat. Dr. Hélène Weiss is making a comparative study of the islets of Langerhans and the amount of insulin extractable from the pancreas in different species. She is also co-operating with continuing studies on factors affecting the amount of insulin extractable from fresh pancreas.

In Professor G. R. Williams' section, a continuous flow method for the study of the metabolism of the rat diaphragm preparation has been developed. The question of the existence of an induction period in the action of insulin on glucose uptake by muscle has been investigated using the new technique.

In Professor E. Schönbaum's section, Dr. Schönbaum, with Dr. Casselman and Dr. O. Heroux of the section of Applied Biology, National Research Council, Ottawa, has studied various aspects of adrenocortical function in the rat. In addition to some observations relevant to the hypophyseal control of this function, studies on the response to exposure to low environmental temperature were carried out. With Professor C. G. Hunter and Dr. D. G. Baker, Department of Physiological Hygiene, studies on adrenocortical function in whole-body X-irradiation were continued. In a joint project with Professor W. G. Bigelow and Dr. A. C. Trimble, Department of Surgery, chemical studies on the hibernating gland of ground hogs have been carried out.

The results of Dr. W. J. Linghorne's investigations have indicated that basically the processes operating in the periodontium are those in effect throughout the whole skeletal system. In the past year he has been studying the factors involved in determining an osteogenic rather than a fibrous repair. A method has been developed for inducing an osteogenic repair of the periodontium without the use of bone grafts. This method promises to prove suitable for clinical application in periodontal therapy and clinical tests have already indicated its usefulness in the field of oral surgery.

In Professor W. R. Franks' section, cancer research, including virus studies, treatment of carcinogen-induced tumours, and the development of tumour immunity, has been continued with the assistance of Miss A. McGregor, R.N., Miss M. M. Shaw, M.A., and Mr. J. Skublics. Work has been continued toward transmuting a tumour-bearing adult host into a chimera, incompatible with the tumour, by permanently engrafting acceptable "clone" tissues (or self-replicating sub-cellular elements), which independently have been induced to propagate a resistance to the host tumour. It is now evident that such a transmutation can only be accomplished provided the clone and host tissues are made mutually tolerant. Clone tissues were made host-tolerant by injecting host tissue into quasi-heterologous clone donors, neonatally. The host was made clone-tolerant following destruction of the host's native immune mechanisms by

total body radiation. The clone-donor animals were made immune to the genetically quasi-heterologous host tumour following X-ray cure of a transplant. Extension of these experiments to include autogenous carcinogen tumours has presented some technical difficulty in mice, but transplanted tumours have been cured in mice, neonatally made tolerant to the host in which the carcinogen tumour originally arose.

Some mice similarly rendered resistant to S37 tumour later developed a leucosis, a disease of lowered malignancy now shown to be due, apparently, to a virus. Animals resistant to the S37 tumour are usually resistant to the chronic virus disease which, however, remains latent, but becomes manifest if cell-free filtrates of tissues from such mice are passed into normally susceptible mice. Thus, in this instance at least, the tumour-associated virus disease is not normally detected either owing to the tumour precociously killing susceptible animals, or because tumour-immune animals are usually leucosis-immune.

With Mr. G. A. Meek, M.A., studies on the effect of pressure-vibrational energies on blood clotting and related mechanisms have been initiated. The development and construction of the apparatus to permit the calibration of the micro-accelerometer are nearing completion.

With Mr. C. S. Lennox, B.Sc., and Miss Janet Chisholm, the test for post-mortem detection of hypoxia as a cause of death has been extended. When hypoxia in mice is accompanied by exercise or administration of adrenalin, the post-mortem brain lactate is raised above the asphyxia level. Five per cent CO_2 given in hypoxia to prevent the usually accompanying hypocapnoea only slightly lowers the lactate level. The value of the test continues to be explored in forensic and accident investigations.

The advice and active assistance of the Comptroller, Mr. C. R. Cowan, continue to be invaluable in this Department and in the Department of Physiology.

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